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Tsunamis

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OCEANIC ABSTRACTS organizes and indexes worldwide technical literature on all aspects of marine science. Some of the major areas covered are marine biology and biological oceanography, marine pollution, and engineering and materials. OCEANIC ABSTRACTS is produced by Data Courier, Inc., 620 S. Fifth St., Louisville, KY 40202.

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INTRODUCTION

Citations listed here are from the complete ASFA database, which contains items abstracted there during 1978 and through October 1979, and from OCEANIC ABSTRACTS (OA) from the present back to about the middle of 1977. Earlier materials in OA were the subject of the first edition on this topic.

79-04982

Fault mechanism and recurrence time of major earthquakes in southern Kanto district, Japan, as deduced from coastal terrace data.

Matsuda, T.; Ota, Y.; Ando, M.; et al.

Univ. of Tokyo, Earthquake Research Inst., Bunkyo-ku, Tokyo, 113 Japan

GEOLOGICAL SOCIETY OF AMERICA. BULLETIN 89(11). 1610-1618

Nov. 1978 Coden: BUGMAF

illus. refs. (Some in Japanese)

Abs.

Language: ENGLISH

Doc Type: JOURNAL PAPER

The region has had 2 shocks of magnitude 08 during the past 1,000 yr-the 1703 and 1923 earthquakes-which occurred along the Sagami trough. The 1703 earthquake was significantly different from the 1923 earthquake in the distribution of coastal uplift and tsunami ht. The 1703 earthquake deformation is described on the basis of the ht of the marine terraces (particularly the Genroku terrace) along the coast of the southern Kanto region. The 1703 earthquake is interpreted (as is the 1923 earthquake) as the result of low-angle right-lateral faulting with a thrust component at the plate boundary. The fault surface in 1703 was longer (about 200 km) and was located farther E than that of the 1923 earthquake. On the basis of the pattern of coastal uplift and the trend of the Sagami trough, the fault surface of the 1703 earthquake can be divided into 3 planes-the eastern part of the source region (epicenter) of the 1923 earthquake to the W, the Kamagawa submarine cliff in the middle, and a segment near the source region of the 1953 Boso-Oki earthquake ($M=8.0$) to the E. Earthquake recurrence times for these regions and the probability of future major earthquakes there are discussed. (AM, FT)

Descriptors: Earthquakes; Japan Coast; Terraces; Fault zones; Sagami Bay; Submarine troughs; Tectonics; Seismic records; Seismology; Faulting; Tsunamis; Earthquake epicenters; Coastal geomorphology

Identifiers: southern Kanto region; Sagami trough; Genroku terrace; 1703 earthquake; 1923 earthquake; coastal uplift; recurrence time

79-04888

A transport formulation of the tsunami propagation problem.

Preisendorfer, R. W.

NOAA, Pacific Marine Environmental Lab., 3711 15th Ave NE,

Seattle, WA 98105

MARINE GEODESY 2(1). 67-82. 1979 Coden: MAGED9

illus. refs.

Abs.

Language: ENGLISH

Doc Type: JOURNAL PAPER

A numerical procedure is given for the computation of the

reflection and transmission of 2-dimensional, long-time harmonic waves in natural fluid basins. The equations of motion used are linear long-wave equations on a rotating f-plane with bottom friction in which time dependence has been removed by cancellation of the time factor. The formulation is demonstrated using Bristol Bay, Alaska, as an example. The scattering properties of the bay are indicated for waves entering the bay from the Bering Sea. (AM, FT)

Descriptors: Tsunamis; Long waves; Wave motion; Wave propagation; Wave reflection; Bristol Bay; Alaska Coast; Basins; Numerical analysis

Identifiers: harmonic waves

79-04887

A mild-slope wave equation and its application to tsunami calculations.

Jonsson, I. G.; Skovgaard, O.

Technical Univ. of Denmark, Inst. of Hydrodynamics and Hydraulic Engineering, Bldg. 115, DK-2800 Lyngby, Den.

MARINE GEODESY 2(1). 41-58. 1979 Coden: MAGED9

illus. refs.

Abs.

Language: ENGLISH

Doc Type: JOURNAL PAPER

A wave equation correct to 1st order in wave amplitude and bottom slope is used to calculate the wave field around an island of circular cylindrical shape and situated on a paraboloidal shoal in an ocean of constant depth. The sides of the island are assumed fully reflecting. The incident waves are plane, periodic, and of small amplitude. Periods up to 30 min are investigated, and the Coriolis force is neglected. The wave equation is solved analytically, and many numerical computations are carried through. The total wave field over the shoal is presented for 2 discrete periods in the upper end of the tsunami frequency range. The amplitudes at the middle of the front face of the island, and at the middle of the lee face, are given as functions of the wave period, and the existence of "resonance" periods is thus demonstrated. Comparison with solutions to the linearized long-wave equation is made, and the validity range of the shallow water theory is estimated. The geometrical optics, i.e., refraction, approach gives extremely inaccurate amplitudes using intermediate depth (or shallow water) theory. The wave field around a circular island in an ocean of constant depth is also illustrated. (AM)

Descriptors: Tsunamis; Islands; Wave amplitude; Numerical analysis

Identifiers: wave field calculations; prediction methods

79-04886

Tsunami prediction using the reciprocal property of Green's functions.

Loomis, H. G.
NOAA, Environmental Research Labs., Pacific Marine
Environmental Lab., Joint Tsunami Research Effort, 3711 15th
Ave. NE, Seattle, WA 98105
MARINE GEODESY 2(1), 27-39, 1979 Coden: MAGED9
illus. refs.

Abs.

Languages: ENGLISH

Doc Type: JOURNAL PAPER

In 1974 Loomis reported a scheme of composing a tsunami by convoluting the source function with a family of previously calculated responses to unit impulse functions, which had been specified as initial conditions at points in the source region. Green's function for the linear, oceanwide hydrodynamic equation is reciprocal in its time and space coordinates and makes the Loomis scheme considerably more useful. The response at A due to a unit impulse at B is exactly the same as the response at B due to a unit impulse at A. This means that for a prediction at point A, it is necessary only to put a unit impulse at A, time-step the resulting disturbance throughout the ocean, and record the time history of the water level at each grid point in the ocean. This generates all of the Green's functions needed for any source area for a future tsunami prediction scheme at point A. These prerecorded functions are the Green's functions and are available for simulating any tsunami at point A from any source region. A prediction scheme is developed for tsunamis from regions S of the Aleutians. (AM)
Descriptors: Tsunamis; Hydrodynamics; Pacific Ocean North; Aleutian Islands; Wave forecasting; Mathematical analysis
Identifiers: Green's functions; prediction methods

79-04885

Relationship of instruments and policy in the Hawaii warning system.

Adams, W. M.
Univ. of Hawaii, Hawaii Inst. of Geophysics, Honolulu, HI
96822

MARINE GEODESY 2(1), 15-26, 1979 Coden: MAGED9
illus. refs. (1 in Ger.)

Abs.

Languages: ENGLISH

Doc Type: JOURNAL PAPER

The tsunami which follows a strong local earthquake occurs within a few minutes of the origin time requiring that any warning system for such local tsunamis be decentralized. An instrument for assisting local decision makers in discriminating tsunamigenic earthquakes from nontsunamigenic earthquakes has been developed which consists of an analog computer (an inverted pendulum having a period of 0.75 sec and damping about 0.3) and a digital computer (a handwired

signal-recognition circuit), providing output to a display of status on alarm. The level of displacement (or velocity or acceleration), the number of times that the threshold must be exceeded, and the time window in which the exceedance must occur are all adjustable. Initial settings require about 0.06 g 3 times, not more than 10 sec apart. Battery back-up and test circuitry are provided. Since the operating instructions require that motion be felt before the instrument alarm be considered valid, great wt is given to assuring that the instrument will operate when required. The instrument is always "ON," with the earthquake turning it "OFF;" thus, it is continually self-testing. Twelve units have been installed in police stations, fire stations, or similar locations around the State of Hawaii, which funded the system developed at Indiana University. This tsunamic seismic trigger should be considered whenever the primary objective is to trigger an alarm rather than to record data; the emphasis in design and development has been on reminding the local official when there may be a tsunami hazard and not on recording research data. (AM)

Descriptors: Tsunamis; Computer programs; Seismic equipment; Alarm systems

Identifiers: warning systems; seismic trigger

79-04805

Economic justification of tsunami research: A specific example based on reduction of false alarms in Hawaii.
Cox, D. C.
Univ. of Hawaii, Environmental Center, 2550 Campus Rd., Honolulu, HI 96822
MARINE GEODESY 2(1), 59-66, 1979 Coden: MAGED9
illus. refs.
Abs.

Languages: ENGLISH
Doc Type: JOURNAL PAPER

The most significant potential improvement to the Tsunami Warning System and one of the more important practical justifications of tsunami research is the reduction in false alarms. There are both immediate and deferred costs of tsunami false alarms. The immediate costs are the costs of responding to tsunami warnings, false or not. The deferred costs are the tsunami casualties resulting from failures to respond to subsequent warnings, insofar as these are attributable to the loss of public confidence in the warning system due to the false alarms. It is estimated that the Hawaiian response to a tsunami false alarm costs about \$777,000, and that with present warning system policy the average annual costs of such responses is \$264,000. Assigning values to human life and injury, it is estimated that the deferred costs of false alarms average about \$42,000/yr, bringing the total annual costs to \$306,000. An 80% reduction of these costs would justify an annual research expenditure of \$307,000/yr for the next 10 yr. (AM)

Descriptors: Tsunamis; Economics; Hawaii; Costs; Alarm systems
Identifiers: false alarms

79-02773

Review of the 24th Coastal Engineering Conference, November 1977.

Anonymous.

COASTAL ENGINEERING IN JAPAN 20, 171-183, Dec. 1977
Coden: CENJAE6
no refs.
No abs.

Languages: ENGLISH
Doc Type: JOURNAL PAPER

Some 132 papers were presented and discussed at this conference. A review in English was prepared to aid engineers and researchers abroad. The review as a whole is grouped in 6 major subject areas: waves (28 papers), coastal sediment problems and beach processes (18 papers), coastal and offshore structures (44 papers), environmental problems (17 papers), currents (19 papers), and miscellaneous problems (6 papers). (FT)

Descriptors: Conferences; Coastal engineering; Waves; Sediments; Wind waves; Tsunamis; Coastal zones; Offshore structures; Wave forces; Current forces

Identifiers: Japan Society of Civil Engineers; Committee on Coastal Engineering; review of conference; 1977

79-02353

An experimental study of tsunami run-up on uniform slopes.
Togashi, H.; Nakamura, T.
Nagasaki Univ., Dept. of Civil Engineering, 1-14 Bunkyo-cho, Nagasaki, 852 Japan
COASTAL ENGINEERING IN JAPAN 20, 95-108, Dec. 1977
Coden: CENJAE6
illus. refs. (Some in Japanese)
Abs.

Languages: ENGLISH
Doc Type: JOURNAL PAPER

Kaplan's empirical formulas should not be extrapolated as have been done to estimate tsunami run ups. Beyond a point determined by the breaking condition, Kaplan's method of computation gives erroneous values, not only quantitatively but also qualitatively. Run-up ht of tsunamis can be estimated with the author's empirical formulas, which are functions of the slope and the relative depth and are valid in the region of $5 \times 10^{-2} \text{NI/LN}1.3$. Theoretical run-up hts of linear long waves give a little smaller values than the experimental ones, while the author's empirical formulas include the effect of nonlinearity on an average. The breaking condition and the reflection coefficient derived from the linear theory coincide roughly with the experimental results. Therefore, the equations serve to classify the phenomena and to select the formulas to be used. (FT)

Descriptors: Tsunamis; Slopes; Wave run up; Wave heights; Coastal engineering

Identifiers: experimental study; tsunami run ups

79-01861

Dispersion and nonlinearity in tsunami computation.
Shuto, N.

Tonkoku Univ., Dept. of Civil Engineering, Kitahira 2-chome,
Sendai, 980 Japan
COASTAL ENGINEERING IN JAPAN 20, 17-25, Dec. 1977
Codens: CENJAG

illus. refs. (Some in Fr.; Japanese)

Abs.

Languages: ENGLISH

Doc Type: JOURNAL PAPER

A simple analytical method is proposed to evaluate the magnitude of the nonlinear term in comparison with the linear term and that of the dispersion in comparison with the nonlinear term, in the computation of tsunamis. Along the Sanriku coast, which is frequently attacked by tsunamis, no dispersion is required. (AM)

Descriptors: Tsunamis; Dispersion; Japan Coast; Breaking waves; Numerical analysis; Coastal engineering

Identifiers: Sanriku Coast

79-01840

Deep water signature of a tsunami.

Munty, T. S.

Environment Canada, Ocean and Aquatic Sciences, Ottawa,
Ont., Can.

MARINE GEODESY 1(1), 73-102, 1977 Codens: MAGED9

illus. refs.

Abs.

Languages: ENGLISH

Doc Type: JOURNAL PAPER

The study of tsunami is divided into 3 categories: tsunami generation; tsunami propagation; and associated coastal problems. Of the 3, tsunami generation is the least understood. Quantitative prediction of tsunami amplitudes at various coastal locations is hampered by a lack of comprehensive knowledge about the deep-water signature of a tsunami. Because of their size, length and speed, tsunamis are difficult to observe from sea or sky. The deep-water signature of tsunamis is examined from the standpoint of analytical theories, observations, and instrumentation. The Reid and Knowles theory of the inverse tsunami is lacking because it does not consider the influences of scattering, refraction, diffraction and resonance. Some properties of the Ben-Menahem and Rosenman solution, tsunami directivity, and trans-oceanic reflection are discussed along with impulsive waves and the Cauchy-Poisson problem. (FT, AM)

Descriptors: Tsunamis; Physical oceanography; Mathematical analysis; Wave generation; Gravity waves; Deep sea; Physical analysis; Wave kinematics

Identifiers: deep-water signature

79-00874

A look at coastal engineering study in Japan.

Japan Society of Civil Engineers

Yotsuya 1-chome, Shinjuku, Tokyo, Japan

AMERICAN SOCIETY OF CIVIL ENGINEERS. WATERWAY, PORT,
COASTAL, AND OCEAN DIVISION. JOURNAL 104(WW1), 19-38,
Feb. 1978 Codens: JWPCDX

illus. refs.

Abs.

Languages: ENGLISH

Doc Type: JOURNAL PAPER

Some 112 papers presented at the 23 annual National Conference on Coastal Engineering in Japan, 1976 are reviewed. Papers of interest are briefly introduced, according to the subjects of waves (26 papers), coastal sediment problems and beach process (26 papers), coastal and offshore structures (35 papers), tsunami and harbor oscillations (10 papers), environmental problems (16 papers), and miscellaneous problems (5 papers). (AM)

Descriptors: Coastal engineering; Japan; Waves; Sediments; Beaches; Coastal zones; Offshore structures; Tsunamis; Harbors; Environmental conditions; Breakwaters
Identifiers: National conference on Coastal Engineering; review of 112 papers presented

78-06408

On transformation of tsunamis in a coastal zone.

Nakamura, S.
Kyoto Univ., Yoshida-Honmachi, Sakyo-ku, Kyoto, 606 Japan
MARINE TECHNOLOGY SOCIETY. JOURNAL 12(1). 22-25,
Feb.-Mar. 1978 Coden: MTSJBB
illus. refs.

Abs.

Languages: ENGLISH

Doc Type: JOURNAL PAPER

To obtain basic information in establishing warning practices and effective countermeasures against tsunamis on the coast, the refraction of tsunamis in Osaka Bay, Japan, and the tsunami spectra were studied. A refraction diagram of the Chilean Tsunami of 1960 from the S of Japan Islands to Osaka Bay was obtained by numerical computation of a small amplitude wave using a high speed computer. Refraction is an important factor in determining tsunami wave ht distribution along the coast of Kii Peninsula and Shikoku. The mareograms of the tsunamis were analyzed into power spectra to find the frequency characteristics of the tsunamis and their transformation from the open ocean to the head of Osaka Bay. The time dependency of tsunami spectra and tsunami spectra from the open ocean to the bay are discussed. The study of tsunami transformation by refraction diagram is not easy because a tsunami is not a simple monochromatic, small amplitude plane wave. All phenomena of tsunamis are transitional, and tsunamis should be treated as a nonstationary process of the refractive waves. The appreciation of the tsunami in the scope of the nonstationary stochastic process could be important. (AM, FT)
Descriptors: Tsunamis; Coastal zones; Refraction; Numerical analysis; Wave amplitude; Computers; Wave heights; Mareographs
; Power spectra; Plane waves; Japan Coast
Identifiers: Osaka Bay; stochastic processes

78-05936

Seismic sea waves: Tsunamis.

Murty, T. S.
Dept. of Fisheries and the Environment, Ottawa, Ont. Can.
CANADA. FISHERIES RESEARCH BOARD. BULLETIN 1977 Coden:
BFRCA3 337 pp

illus. numerous refs. (Some in Japanese; Russ.)

Eng., Fr. abs.

Languages: ENGLISH

Doc Type: REPORT

Current knowledge of tsunami propagation; tsunami generation by earthquakes, volcanic eruptions and nuclear explosions; and laboratory experiments on tsunami generation and propagation are presented. Various coastal phenomena associated with tsunamis are considered in detail. Descriptions of tsunamis in various regions from 1400 B.C. to 1975 are supported by detailed tables and illustrations. Past, present, and future tsunami warning systems and protection measures are discussed.

The appendix describes the following seismological phenomena: global tectonics and the structure of the earth, seismic waves and concepts of intensity and magnitude, epicenter determination and travel-time curves, earthquake mechanism, regional seismicity, and earthquake prediction and control. (BU)

Descriptors: Books; Tsunamis; Seismic waves; Wave generation ; Earthquakes; Wave propagation; Coastal protection

78-05324

Acceleration and impact of structures moved by tsunamis or flash floods.

Camfield, F. E.
U.S. Dept. of the Army, Coastal Engineering Research Center, Kingman Bldg., Ft. Belvoir, VA 22060
U.S. ARMY CORPS OF ENGINEERS. COASTAL ENGINEERING TECHNICAL AID 78-1 Feb. 1978 14 pp
illus. refs. (1 in Fr.)

Abs.

Languages: ENGLISH

Doc Type: REPORT

A high velocity flow of a wall of water surging over land, such as found in some tsunamis or flash floods, may carry forward structures which will impact with other structures. To estimate the forces on a structure resulting from the impact of other structures, the velocity of the moved objects and the impact force are solved as a function of the initial distance between the structures and the velocity of the surging water. The distance (x) a structure will move as a function of time t is as follows: $x=ut (aut+1)$ where u is the velocity of water and a is a constant. The velocity of a structure (ub) as a function of time is $ub=ut$ and the force, F, accelerating the building at any instant in time is as follows: $F=qva (u-ub)^2$ where q is the mass density of water.130 Tsunamis.Wave velocity.Storm surges.Measuring methods.Mathematical models.Wave forces (FT)
Identifiers: impact forces; free-floating structures; flash floods

78-05091

Geology at the shoreline Topanga Beach, Los Angeles County, California.

Cleveland, G. B.

California Div. of Mines and Geology, Sacramento, CA 95814
CALIFORNIA GEOLOGY 30(8), 171-176, Aug. 1977 Coden: CGEOAO

illus. refs.

No abs.

Languages: ENGLISH

Doc Type: JOURNAL PAPER

A site study of geologic and shoreline processes was made at Topanga Beach State Park. The park is a 1-mi-long strip of beach that lies along State Highway 1 extending from the Los Angeles City boundary westward to just beyond the mouth of Topanga Creek on the S edge of the Santa Monica Mountains. The physical setting of the beach is described. The general geology of the area is shown on a geologic map. Geologic units exposed in the study area consist of 2 bedrock units and several surficial units. Surficial deposits consist of backshore beach sand and dunes, stream deposits, cliff talus, and artificial fill. Although the basic geologic features of the park site are relatively stable, active geologic processes lead to changes in the distribution and nature of the surficial deposits. The erosion, deposition, and redistribution of shoreline material can be traced to several interrelated processes. These processes include climatic factors, longshore drift, wave action, rip currents, wind erosion, and fluvial conditions. In addition to the forces of water and wind, the broad distribution and maintenance of the beach is controlled by large scale features of the geography. The influence of man-made structures on the distribution and maintenance of the beach sand is minimal. The geologic hazards include seismicity and tsunamis. (FT)

Descriptors: Geology; Geologic structures; Geologic surveys; California Coast; Bedrock; Sands; Sand dunes; Shores; Geography; Beach erosion; Wind forces; Earthquakes; Tsunamis; Hydrographic data; Climatic data

Identifiers: wind forces; Topanga Beach State Park; Los Angeles County; surficial geologic units; geologic processes; geologic hazards

78-03469

Height variations of large-amplitude solitary waves in the near-shore zone.

Okeanologiya, 17(1), 1977 (American Geophysical Union).

Pelinovskiy, Ye. N.; Talipova, T. G.

Gorky Radiophysics Research Inst., USSR

OCEANOLOGY 17(1), 1-3, Aug. 1977 Coden: ONLGAE

illus. refs. (1 in Russ.)

Abs.

Languages: ENGLISH

Doc Type: JOURNAL PAPER

The ht variation of a tsunami solitary wave is calculated

for a smooth change in depth. The depth at which the wave breaks and the wave amplitude at that instant are found. For practical calculations of the ht of a wave of any amplitude one can use the approximate relation obtained earlier for small-amplitude solitary waves. (AM)

Descriptors: Wave heights; Wave amplitude; Tsunamis; Numerical analysis; Depth

Identifiers: solitary waves; nearshore zone

78-03441

Interaction of tsunamis with the Hawaiian Islands calculated by a finite-element numerical model.

Houston, J. R.

ACE Waterways Experiment Station, P.O. Box 631, Vicksburg, MS 39810

JOURNAL OF PHYSICAL OCEANOGRAPHY 8(1), 93-102, Jan. 1978 Coden: JPYOBT

illus. refs.

Abs.

Languages: ENGLISH

Doc Type: JOURNAL PAPER

The model employs a finite-element grid which telescopes from a large cell size in the deep ocean to a very small size in shallow coastal waters and covers a region which includes the 8 major islands of the Hawaiian Islands. The numerical model solves the problem of tsunami propagation from the deep ocean to the coasts of these islands. Although time periodic motion is assumed in the solution, the interaction of an arbitrary tsunami waveform with the islands can easily be determined within the framework of a linear theory by superposition. The deep-ocean waveforms of the 1960 and 1974 Alaskan tsunamis are determined for use as input to verify the finite-element model by employing a finite-difference numerical model which assumes as an initial condition that the uplift movement of the seafloor in the source region during an earthquake is instantaneous and results in a water surface elevation identical to the known permanent vertical displacement of the seafloor. The finite-difference model propagates the waves radiated from the source regions to a deep-ocean area near the Hawaiian Islands using a 2-dimensional spherical coordinate grid to solve the linear long-wave equations. The finite-element model is verified by determining time history responses at coastal locations using these deep-water time histories as input. Numerical model calculations are in good agreement with tide gauge recordings of the 1964 Alaskan tsunami at Kahului, Maui; Honolulu, Oahu; and Hilo, Hawaii; and the 1960 Chilean tsunami at Honolulu, which was the only location where the 1960 tsunami did not destroy the gauge. (AM)

Descriptors: Numerical analysis; Tsunamis; Hawaiian

Archipelago; Mathematical models; Wave propagation

Identifiers: finite element model

78-00581

Coastal zone geology near Gualala, California.

Williams, J. W.; Bedrossian, T. L.
San Jose State Univ., San Jose, CA 95114
CALIFORNIA GEOLOGY 30(2), 27-34, Feb. 1977 Coden:

CGEOAQ

illus. refs.

No abs.

Languages: ENGLISH

Geologic hazards and mineral resources between Schooner Gulch and the Gualala River, Mendocino County, a 35-mi² area along the California coast, were investigated by the California Division of Mines and Geology (CDMG). The reconnaissance study, undertaken at the request of the North Coast Region of the California Coastal Zone Conservation Commission (CCZCC), describes geologic factors important to land-use planners within this small portion of the California coastal zone. The investigation is summarized. Geologic data use, geologic setting (bedrock, surface deposits), and geologic factors (landslides, sea cliff retreat, earthquake shaking, fault rupture, tsunami inundation, flooding, erosion, and mineral resources) are described. (from Text)

Descriptors: California Coast; Geologic parameters; Coastal zones; Bedrock; Sea cliffs; Earthquakes; Faulting; Tsunamis; Erosion; Mineral resources; Waterflooding; Beaches
Identifiers: geologic hazards; Schooner Gulch; Gualala River
; land-use planning; surface deposits; landslides; flooding

78-00526

Tsunamis.

Anonymous.

CALIFORNIA GEOLOGY 30(4), 88-89, Apr. 1977 Coden:

CGEOAQ

illus. no refs.

No abs.

Languages: ENGLISH

Large seismic sea waves, tsunamis, are studied by creating and observing miniaturized versions of them in a 100-ft-long laboratory wave tank, Tsunamiis, which are a major natural hazard borne of undersea earthquakes, landslides, and volcanic activity, may travel thousands of oceans. They are very long waves-perhaps 100-200 mi from crest to crest-which may rise only 1-2 ft in the open ocean, but at the coast they may cause extreme damage 50-100 ft above the normal ocean level. The speeds of the waves vary, being faster when they move over deeper parts of the ocean than over shallow. The likelihood of a coastal area being damaged by tsunamis depends not only on the area's orientation in relation to the direction of wave movement, but more importantly on the contouring of the seafloor in that area. Tsunami research is being done at Caltech's W. M. Keck Laboratory of Hydraulics and Water Resources. An important aspect of the generation process which affects the wave height emanating from a source region is the ratio between the time of generation and the time it takes

a wave to propagate from the generating region. Another important aspect of the research has been an investigation of how these waves travel and how they change in shape as they travel. The changes in shape may be very important in defining how various harbors react to a given tsunami. (from Text)
Descriptors: Tsunamiis; Seismic waves; Wave speed; Coastal zones; Wave heights; Wave generation; Wave propagation
Identifiers: W. M. Keck Lab. of Hydraulics & Water Resources
; laboratory wave tank research; Calif. Inst. of Technology

77-04462

NUMERICAL COMPUTATION OF TSUNAMI RESPONSE FOR ISLAND SYSTEMS.

BERNARD, E.N.

UNIV. OF HAWAII/NOAA, JOINT TSUNAMI RESEARCH EFFORT,
HONOLULU, HI 96706

JOURNAL OF PHYSICAL OCEANOGRAPHY, 7(3): 389-395, MAY 1977

Languages: ENGLISH

Descriptors: TSUNAMIS; SHORES; MATHEMATICAL MODELS; HAWAII; ISLANDS

Identifiers: SHORELINE TIME SERIES

0957044 209-07044

Tsunami engineering.

.Donn,W.G.van.

Address not stated

LANGUAGES: English

DOC TYPE: Book

JOURNAL ANNOUNCEMENT: 7909

Although tsunamis have sporadically wrought destruction along oceanic coastlines for centuries, only within the last decade has a sufficient knowledge of their characteristics and behavior been obtained to provide some general guidance to engineers faced with the problem of designing coastal structures. While even today we lack adequate statistics to properly assess the long-term probability of tsunami occurrence, the theoretical and computational tools are in hand to make reasonable estimates of local effects from hypothetical tsunamis. Application of these methods should substantially reduce the incidence and extent of future damage. Before discussing their engineering aspects, it is important to place tsunamis in a proper perspective as natural phenomena to understand how they are generated, how they expand and propagate across the ocean and, lastly, how they are transformed in shallow water and rush up along the shore.

DESCRIPTORS: tsunamis; coastal engineering

ENVIRONMENT: Marine

SECTION HEADING CODES: 2327

0950684 209-06684

Numerical modelling of tsunamis-forecasting heights in a warning system.

.Hwang,L.-S..

Address not stated

In.: Topics in ocean engineering, Volume 3.

, Publ.by.: Gulf-Houston, TX (USA), 1976.

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Book

REPORT NO.: p 278-304

JOURNAL ANNOUNCEMENT: 7909

Tsunamis are caused by large shallow undersea earthquakes which involve tectonic displacements of the sea bed. Part of the energy of the seismic disturbance is taken up by very low amplitude long water waves which travel from the generation area throughout the ocean basin. As the waves approach coastal areas, the amplitudes increase to form huge masses of water which strike coastlines with devastating results. The passage of these waves near the bays and harbors also can excite the natural frequency of these basins so that large waves are produced even in supposedly protected areas. Obviously, loss of life and considerable property damage result. Certain areas of the Pacific basin are known to be breeding grounds for earthquakes, and certain coastal areas are repeatedly damaged by tsunamis. With these facts in mind a tsunami warning system

has been established. Earthquakes which occur in a tsunami generation area are immediately reported to the warning center. At the warning center the earthquake location is used to predict arrival times for the tsunami at vulnerable coastal stations. This information is then relayed to the areas which might be affected. The system as it operates today only provides the information of arrival time. Much work remains to be done before the system can give accurate information on waves along the coast where damage is likely to occur.

DESCRIPTORS: tsunamis; warning systems; wave forecasting

ENVIRONMENT: Marine

SECTION HEADING CODES: 2167

0955762 209-05762

Tsunami protection of coastal nuclear power plants in the United States.

.Hulman,L.G.; Bivins,W.S.; Fliegel,M.H.

Hydrol.-Meteorol. Branch, U.S. Nucl. Regulatory Comm., Washington, D.C., USA

Mar. Geol., 1(4), 375-385, (1978)

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7907

Protection from potential tsunami effects is a design criterion for coastal nuclear power plants, especially on the U.S. Pacific Coast and in Puerto Rico. Because of the uncertainties involved in the probabilistic approach, the U.S. Nuclear Regulatory Commission uses a deterministic approach to conservatively estimate tsunami runup, drawdown, and the resulting effects at proposed nuclear power plants sites. However, because of the lack of good data to verify the tsunami models used, very conservative input parameters are used in tsunami analysis. The results may lead to overly conservative and expensive designs for the protection of nuclear power plants from the effects of tsunamis.

DESCRIPTORS: tsunamis; shore protection; power plants; nuclear energy

GEOGRAPHIC DESCRIPTORS: USA, Coasts

ENVIRONMENT: Marine

IDENTIFIERS: wave run-up; mathematical models; design

SECTION HEADING CODES: 2327; 2324; 2167

Recurrence of tsunamis in the western coast of South America.

Silgado, E.

Cent. Reg. Sismol., Para Merica del Sur, Lima, Peru

Mar. Geod., 1(4), 347-354, (1978)

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7907

Intensity-frequency relations are determined for tsunamis originated in the western coast of South America, along a length of about 5000 km. Basic data for the period 1749-1974 are taken from recent catalogues. An empirical correlation of near-source tsunami with earthquake magnitude for the region has been found. Statistics of Extreme Values are used in the investigation of tsunami recurrence. On the basis of present data, tsunami risk and return period are computed.

DESCRIPTORS: tsunamis; earthquakes; probability theory

GEOGRAPHIC DESCRIPTORS: ISE, South America; PSW, South

America

ENVIRONMENT: Marine

IDENTIFIERS: extreme values; risks; frequency

SECTION HEADING CODES: 2167; 2270

0955497 209-05497

Path of propagation of tsunami waves.

Nakano, M.

Fac. Mar. Sci. Technol., Tokai Univ., Shimizu-shi, Japan

Mar. Geod., 1(4), 331-346, (1978)

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7907

On the basis of the so-called 'Fermat's Principle,' that tsunami waves proceed along such a path that the time required is minimum, the differential equation of the path of propagation was derived by applying Calculus of Variations, on the condition that the position of the wave source and that of the observing station are given. Solving the differential equation, for some cases where the distribution of water depth may be expressed by simple mathematical expressions, the path of propagation for each case was determined. The result of the application of the above method to the case of the 'Tokachi-oki Tsunami' in 1968 is introduced as an example in this paper.

DESCRIPTORS: tsunamis; wave propagation

ENVIRONMENT: Marine

IDENTIFIERS: mathematical models; epicentres

SECTION HEADING CODES: 2167; 2270

0955495 209-05495

Farrenas, S.F.
Cent. Invest. Cient. Educ. Super., Ensenada, Baja California, Mexico
Mar. Geod., 1(4), 355-360, (1978)
LANGUAGES: English
SUMMARY LANGUAGES: English
DOC TYPE: Journal Article
JOURNAL ANNOUNCEMENT: 7907

Normalized energy density spectra were obtained from the tide-gauge records of Concepcion Bay (Chile) for March 10, 1957, May 22, 1960, and March 28, 1964 tsunamis. Distribution of energy peaks with frequency is explained by means of a rectangular bay resonant model, and are identified as the first, second, and third harmonic modes of oscillation. For the 1960 tsunami, amplification factors computed from offshore sea surface elevation predictions agree reasonably with the values given by the model.

DESCRIPTORS: tsunamis; resonance

GEOGRAPHIC DESCRIPTORS: PSW, Concepcion Bay

ENVIRONMENT: Marine

IDENTIFIERS: tide gauges; harmonics; oscillations; sea

surface topography

SECTION HEADING CODES: 2167

0955493 209-05493

Determination of the fault model consistent with the tsunami generation of the 1964 Niigata Earthquake.

Abe, K.

Nippon Dental Univ., Niigata, Niigata-shi, Japan

Mar. Geod., 1(4), 313-330, (1978)

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7907

A fault model was investigated for the Niigata Earthquake of June 16, 1964, and one consistent with the tsunami generation was obtained, using tide gauge records and inundation heights. Main parameters in the model were as follows: reverse fault with a displacement of 6.1 m, strike of N22.degree.E, and dip angle of 45.degree. in the direction of N68.degree.W, having a dimension of 55 km in length and 20 km width. In this process it was found that the sea level ratio of the initial wave to the reflected one is sensitive to a dip angle. It is noticeable that the dimension is small and the displacement is large, but the seismic moment is nearly equal in comparison with proposed models for this event. It is important to investigate each parameter of the fault model by applying it to the tsunami generation.

DESCRIPTORS: tsunamis; earthquakes; wave generation; faulting; models

GEOGRAPHIC DESCRIPTORS: INW, Japan, Niigata

ENVIRONMENT: Marine

IDENTIFIERS: tide gauges; sea level; wave reflection; seismic waves

SECTION HEADING CODES: 2167; 2270

0955480 209-05480

Bottom hydrophysical observations near Shikotan Island. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Soloviev, S.L.; Khristoforov, G.N.; Jacques, V.M.

Sakhalin Complex Sci. Res. Inst. Acad. Sci., HPO, Shikotan, USSR

, (no. 15)

n: Tsunami Research Symposium 1974. Heath R.A.-Cresswell M.M. (eds) Unesco Press-Paris (France) 1976 p. 35

ISBN 92-3-101330-0

en.

DOC TYPE: Conference; Summary; Book

JOURNAL ANNOUNCEMENT: 7907

In autumn 1973, three bottom hydrophysical installations were put into operation 15 km from Shikotan Island. The average distance between installations was 5 km. Hydrostatic pressure, i.e., water height, temperature and velocity of near-bottom currents, are measured in sequence every 10 sec. In addition, a bottom seismograph has been installed. Records obtained show that local conditions still influence long-term

processes. Tide heights on the shelf are somewhat greater than those in Malokuriziskaya Bay. Near-bottom currents are partly turbulent. Daily changes of near-bottom temperatures reach 3-5.degree.. All hydrophysical fields change during typhoons.

GEOGRAPHIC DESCRIPTORS: INW, Japan, Shikotan I.

ENVIRONMENT: Marine

IDENTIFIERS: water depth; tide heights

SECTION HEADING CODES: 2165

0952740 209-02740

Acceleration and impact of structures moved by tsunamis or flash floods.

Camfield, F.E.

Dep. Army Coastal Eng. Res. Cent., Kingman Building, Fort Belvoir, VA 22060, USA

Coast. Eng. Tech. Aid U.S. Army Coast Eng. Res. Cent.

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Book

JOURNAL ANNOUNCEMENT: 7903

Techniques are given for determining the velocity of a structure moved by a tsunami or flash flood and impact forces with another structure. Solutions can be obtained for velocity and impact force as a function of the initial distance between the structures and the velocity of the surging water.

DESCRIPTORS: surges; tsunamis; structures; dynamic loads; wave forces; current forces

ENVIRONMENT: Marine

IDENTIFIERS: acceleration; collisions

SECTION HEADING CODES: 2284

- 0952737 209-02737
Mindanao, Philippines, earthquake report.
Earthquake Engineering Research Institute, Berkeley, CA (USA). EERI Reconnaissance Team
LANGUAGES: English
Price: in USA \$10.00, elsewhere \$11.00
DOC TYPE: Report
JOURNAL ANNOUNCEMENT: 7903
An EERI Reconnaissance Team, under the leadership of J.L. Stratta, arrived on the scene of the disastrous Southern Philippines earthquake of 17 August 1976 within a few days, before the clean-up had progressed. The team, including T.J. Canon, C.M. Duke and L.G. Selna, has published the results of its survey. Its report contains chapters on soils, lifelines, tsunami, building damage, bridge damage, and a summary of its on-site observations. The report is augmented by social science observations by J.E. Haas and a discussion of Mindanao seismicity by D.J. Leeds. Some 119 figures illustrate the earthquake effects.
DESCRIPTORS: earthquakes; damage; tsunamis
GEOGRAPHIC DESCRIPTORS: Philippines, Mindanao
SECTION HEADING CODES: 2284
- 0952255 209-02255
Manuscr. Rep. Ser. Mar. Sci. Dir. (Can.)
Tsunamis - a selected bibliography. Presented on microfiche, with introduction in English and French.
Chawla, R.J.K.
Marine Sciences Directorate, Ottawa, Ont. (Canada)
, (no. 51)
LANGUAGES: English
DOC TYPE: Bibliography; Book
JOURNAL ANNOUNCEMENT: 7903
About 1900 references are presented on microfiche from works consulted from organizations over the world.
ENVIRONMENT: Marine
SECTION HEADING CODES: 2167
- 0952254 209-02254
Survey of theoretical research into tsunamis and observation of actual tsunamis in Japan.
Nagata, Y.
Geophys. Inst., Univ. Tokyo, Japan
Lecture Notes in Physics, (vol. 64)
n: Waves on water of variable depth. Provis D.G.-Radok R. (eds.) Springer-Verlag-Berlin (German Fed. Rep.) 1977 p.49-62
En en.
DOC TYPE: Book
JOURNAL ANNOUNCEMENT: 7903
The coast of Japan has been attacked frequently by tsunamis: 72 tsunamis caused by earthquakes in and near Japan were recorded from 1893-1968 (Hatori, 1969) and 14 transoceanic
- tsunamis from 1918-1968 (Haton, 1973). Scientific investigations started after the 1896 Sanriku tsunami which caused the most severe damage in recent tsunami history. Three main theories were put forward to explain the phenomena which although at the time appeared contradictory, in the light of present day knowledge, spotlight three different lines of attack for tsunami investigation: (1) relationships between earthquakes and tsunamis, or more precisely, prediction of sea bottom deformations from the seismic fault model (2) generation and propagation problems for a given sea bottom deformation (3) shelf or coastal effects on the wave form of the tsunami.
DESCRIPTORS: tsunamis; research
GEOGRAPHIC DESCRIPTORS: INE, Japan
IDENTIFIERS: earthquakes
SECTION HEADING CODES: 2167
- 0952248 209-02248
Local behaviour of tsunamis.
Kajiura, K.
Earthquake Res. Inst., Univ. Tokyo, Bunkyo-ku, Tokyo 113, Japan
Lecture Notes in Physics, (vol. 64)
n: Waves on water of variable depth. Provis D.G.-Radok R. (eds.) Springer-Verlag-Berlin (German Fed. Rep.) 1977 p.72-78
En en.
DOC TYPE: Book
JOURNAL ANNOUNCEMENT: 7903
Scale parameters of large tsunamis suggest that non-linearity of waves is important only within a short distance of about a half wave-length from the shoreline. The Carrier-Greenspan transformation of the non-linear shallow-water equations on a uniformly sloping beach is elucidated to give a set of linear equations analogous to the linearized equations of the original non-linear equations, and an explicit form of the wave-breaking criterion is given. Although a weak bore (or an undular bore) may be formed close to shore if the head wave of a tsunami is a positive wave, there may be no bore formation at all if the negative wave forms the front. The maximum run-up of a tsunami is caused mostly by the non-breaking wave enhanced by the effect of bay resonance.
DESCRIPTORS: tsunamis; shallow water
SECTION HEADING CODES: 2166

IDENTIFIERS: wave propagation
SECTION HEADING CODES: 2161

0952247 209-02247

Numerical simulation of tsunami generation and propagation in the ocean with a real bathymetry.

Alexeev, A.S.; Gussyakov, V.K.

Computing Cent., Novosibirsk 630090, Siberian Branch of the USSR Acad. Sci., USSR

Lecture Notes in Physics, (vol. 64)

n: Waves on water of variable depth. Provis D.G.~Radok R. (eds.) Springer-Verlag-Berlin (Germany Fed. Rep.) 1977 p.63-70 En en.

DOC TYPE: Book

JOURNAL ANNOUNCEMENT: 7903

Compared with advanced numerical methods for solving the problem of tsunami wave propagation and the explicit physical statements of problems of waves running in to shore, the problem of generation of tsunami waves by submarine earthquakes still remains a weakness. This problem is of primary importance both for the analysts of the complex geophysical phenomena preceding and accompanying tsunamis and for investigations into tsunami forecasting and advanced warning systems. The present paper presents a numerical simulation of the generation of elastic waves in the Earth's crust and of gravitational and acoustic waves in the ocean during a submarine earthquake. Properties of these waves are considered in their dependence on seismic parameters in a search for connections between the properties of tsunamis and their seismic forerunners. The proposed methods of calculation of tsunamis in the generation area make it possible to link the seismic problem of tsunami wave generation to the hydrodynamic problem of tsunami propagation in an ocean of varying depth.

DESCRIPTORS: mathematical models; tsunamis

SECTION HEADING CODES: 2166

0952183 209-02183

Waves on water of variable depth.

Provis, D.G.; Radok, R.

eds.

Lecture Notes in Physics, (vol. 64)

LANGUAGES: English

SUMMARY LANGUAGES: English

L6.50

DOC TYPE: Book

JOURNAL ANNOUNCEMENT: 7903

Twenty-six papers make up this book on 'Waves on water of variable depth'. The papers are subdivided into six sections as follows: (1) wave propagation in water of variable depth (2) tsunami generation and propagation (3) waves on beaches (4) waves and currents (5) waves in a rotating stratified medium (6) long period barotropic waves. Abstracts of individual papers appear in the appropriate sections of this month's issue of ASFA 2.

DESCRIPTORS: wave generation; tsunamis; water depth; waves; beaches

0951272 209-01272

Recording of tsunamis by tide wells. Presented at: International Union of Geodesy and Geophysics Tsunami Committee meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Noye, B.J.

Dep. Appl. Math., Univ. Adelaide, S.A., Australia

J. (no.15)

n: Tsunami Research Symposium 1974 Heath R.A.~Cresswell M.M. (eds.) Unesco Press-Panis (France) 1976. p.87-94

ISBN 92-3-101330-0

En en.

DOC TYPE: Conference; Book

JOURNAL ANNOUNCEMENT: 7902

Results of several recent studies concerning the nature of tide-well response have important implications to measurement of tsunamis. The outstanding characteristic of the response of the conventional tide-well system is that it is non-linear. This creates difficulties when tsunami readings are to be extracted from a tide-well record, as the tsunami record is superimposed on the periodic rise and fall of the tide. Oscillations in the well record include some due to non-linear interaction between the tsunami and tide oscillations, and the recorded amplitudes are non-linear functions of the amplitudes of the incident oscillations. By replacing the orifice of the conventional tide-well with a long horizontal pipe connection of suitable dimensions, the system becomes linear. Unsteady effects in the pipe flow produce the main features of the frequency response which is governed by a tide-well parameter N , a function of the well and pipe dimensions for $N = 1/3$, unit amplitude response occurs for the widest frequency range with a constant small time lag over this range. This is the optimum system for recording tsunamis. A method has been developed to correct the well record for the amplitude attenuation and time lag inherent in these systems, thereby giving the sea-level readings outside the tide-well. This can be used to reconstruct true tsunami measurements from a record of tide plus tsunamis obtained with either type of tide-well.

ENVIRONMENT: Marine

IDENTIFIERS: sea level; recording equipment

SECTION HEADING CODES: 2167

ENVIRONMENT: Marine
SECTION HEADING CODES: 2167

0951271 209-01271

Numerical tsunami simulation. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.
Mader, C.L.

Los Alamos Sci. Lab., Univ. California, Los Alamos, NM 87544, USA

(no.15)

n: Tsunami Research Symposium 1974 Heath R.A.-Cresswell M.M. (eds.) Unesco press-Paris (France) 1976 p.223
SBN 92-3-101330-0

en.
DOC TYPE: Conference; Summary; Book
JOURNAL ANNOUNCEMENT: 7902

Two-dimensional, time-dependent, nonlinear, incompressible, viscous flow calculations of realistic models of tsunami waves interacting with continental slopes and shelves have been performed. Wave heights were observed to grow by a factor of 4 as they shoaled up a 1/15 continental slope. The second or third wave often exhibited the largest wave run-up. Comparisons with shallow-water, long-wave calculations showed similar results except for short wavelength tsunamis. The damping action of submerged barriers on tsunami waves was investigated using numerical simulation of the flow. The effectiveness of the damping action of the submerged barriers on tsunami waves is similar to that observed experimentally for shallow water waves of much shorter wavelength. The numerical simulation of tsunami waves can provide realistic descriptions of their propagation. Three-dimensional calculations of tsunami waves interacting with harbors, with multi-dimensional barriers, and with the ocean floor over the entire ocean are within the state-of-the-art.

ENVIRONMENT: Marine

IDENTIFIERS: continental slopes

SECTION HEADING CODES: 2167

0951264 209-01264

Metody rascheta vozniknoveniya i rasprostraneniya tsunami. Methods for the computation of tsunami generation and propagation.
Solov'ev, S.L.
ed.

LANGUAGES: Russian

SUMMARY LANGUAGES: Russian

DOC TYPE: Book

JOURNAL ANNOUNCEMENT: 7902

This is a collection of papers dealing with modern, often contradictory ideas on the generation of tsunami waves by earthquakes and other processes. The mathematical mechanism used to describe the generated tsunami waves is considered and the results of the hydraulic modeling of tsunami generating processes are discussed.

DESCRIPTORS: tsunamis;

WAVE GENERATION; World Ocean

GEOGRAPHIC DESCRIPTORS: wave generation; hydraulic models

0951205 209-01205

Description of a low-cost, portable tsunami wave recorder. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.
Loomis, H.G.

Joint Tsunami Res. Effort, NOAA, Honolulu, HI, USA

(no.15)

n: Tsunami Research Symposium 1974 Heath R.A.-Cresswell M.M. (eds.) Unesco Press-Paris (France) 1976. p.95-98
En. en.

SBN 92-3-101330-0

DOC TYPE: Conference; Book

JOURNAL ANNOUNCEMENT: 7902

The recent appearance on the market of an electronic solid-state pressure transducer has made possible a very small and convenient portable tsunami wave recorder. The entire unit could be packaged into the unused space inside a Rustrak strip-chart recorder. However, that was not done in the recorder described here, as provisions for electronic filtering of long or short waves were included. The unit can be used for recording tides, tsunamis, and/or short period waves. The unit runs on 18 V dc provided by batteries or a power supply.

TAXONOMIC DESCRIPTORS: tsunamis

ENVIRONMENT: Marine

SECTION HEADING CODES: 2162

0858787 208-08787

Tsunami suppressor in sloped bottom harbour. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Nakamura, S.
Disaster Prevention Res. Inst., Kyoto Univ., Kyoto, Japan
, (no. 15)

Bull. R. Soc. N.Z.
In: Tsunami Research Symposium 1974
Heath, R.A.; Cresswell, M.M. eds.)
PUBL: Unesco Press, Paris (France), 1976., p. 165-176
En en.

DOC TYPE: Conference; Book
REPORT NO.: ISBN: 92-3-101330-0
JOURNAL ANNOUNCEMENT: 7812

Some defence against damage from tsunamis can be gained by protecting harbours that head into the direction from which tsunamis come. Such protection will increase the safety of both homes and harbour facilities. The author suggests the introduction of an effective tsunami suppressor in a sloped bottom harbour model. Assume that a rectangular harbour model with a pair of breakwaters has an opening at the harbour mouth. Water depth decreases linearly from the harbour mouth to the head of the harbour. The slope of the bottom for the experiment is taken as $1/50$ in the harbour and $1/200$ above shore line. The amplification ratio is defined as the ratio of wave height between that at a station in the harbour and that at the harbour entrance. Such amplification ratios are determined in order to find the dependency of wave period and wave steepness. The experimental conditions are given in the range of 1.8×10^{-3} to 1.8×10^{-2} for $T(g/h)$, $SUP-5$, and in the range of 1.8×10^{-3} to 1.8×10^{-2} for $T(g/h)$, $SUP-5$, where T denotes wave period, h and H are water depth and wave height at the harbour entrance and L is wave length (computed by the theory of long waves) for a given h and T . The experimental result for the simple harbour model is discussed by previous authors, who suggest that one pair of breakwaters acts as an effective suppressor in a sloped bottom harbour, but that this is not sufficient in a harbour of constant depth. An additional pair of breakwaters is introduced in a sloped bottom harbour so that the first pair, at the entrance to the harbour, forms the primary tsunami suppressor and divide the harbour area into two equal parts. Experiments showed how the doubled pairs of breakwaters resulted in lessened tsunami effects in a sloped bottom harbour. The effect of the opening at the entrance is also discussed.

ENVIRONMENT: Marine
IDENTIFIERS: models
SECTION HEADING CODES: 2327

0858412 208-08412

The response of several New Zealand harbours to the 1969

Chilean Tsunami. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Heath, R.A.
New Zealand Oceanogr. Inst., Dep. Sci. Ind. Res., Wellington, New Zealand
, (no. 15)

Bull. R. Soc. N.Z.
In: Tsunami Research Symposium 1974.
Heath, R.A.; Cresswell, M.M. eds.)
PUBL: Unesco Press, Paris (France), 1976., p. 71-82
En en.

DOC TYPE: Conference; Book
REPORT NO.: ISBN: 92-3-101330-0
JOURNAL ANNOUNCEMENT: 7812

The dominant period of oscillations produced in several east coast New Zealand harbours in response to the 1960 Chilean tsunami are determined by spectral analysis. These are compared with the possible modes of oscillation calculated by numerical integration of the linear one-dimensional momentum equation and the continuity equation. End corrections are calculated, and the Q 's calculated assuming a radiation loss compare favourably with those calculated from the observed damping of the records. The probable response of the east coast harbours to tsunami are then discussed.

GEOGRAPHIC DESCRIPTORS: PSE, New Zealand
ENVIRONMENT: Marine
SECTION HEADING CODES: 2167

0858409 208-08409

Deep water signature of a tsunami.
Murtv, T.S.

Ocean and Aquat. Sci., Dep. Environ., Ottawa, Canada
Mar. Geol., 1(1), 73-102, (1977)

LANGUAGES: English
SUMMARY LANGUAGES: English
DOC TYPE: Journal Article
JOURNAL ANNOUNCEMENT: 7812

The dynamics of tsunamis can be divided, for convenience, into three parts: tsunami generation, tsunami propagation, and the coastal problems. Out of these three, the problem of tsunami propagation is probably better understood than the other two. One of the main hindrances to the quantitative prediction of tsunami amplitudes at various coastal locations is a lack of detailed knowledge about the deep water signature of a tsunami. Here, the present understanding of the problem is discussed.

DESCRIPTORS: tsunamis; predictions; deep water;
propagation; dynamic
ENVIRONMENT: Marine
IDENTIFIERS: wave generation; geodesy
SECTION HEADING CODES: 2167

08583396 208-08396

A study on natural oscillations in the sea level of Kunile and Kamchatka inlets. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Yaroshenja, R.A.

Far East Hydrometeorol. Res. Inst., Vladivostok, USSR

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 39-50

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

Resonance causes the amplitude of tsunamis to sharply increase in basins with the basin responding at its natural period. Here natural oscillations of inlets are studied by both computational methods and spectral analysis. Spectral analyses of 47 tide gauge records (about 1000 hours) allow the determination of the main periods of oscillations. Tidal records were photographically enlarged and digitized at 1.66 min intervals. It was determined that: (a) the spectra of the same tsunami in different points are different due to the bottom topography (b) the spectra of different tsunamis in the same points are similar (c) in spectra of distant tsunamis there is a long wave component which is absent in spectra of near tsunamis. Calculation of natural oscillations was made by methods of Merlan, Defant, Proudman, Neumann, Honda, Terada, Istanti et al. The results of calculation allow the accuracy of each of these methods to be evaluated and indicate that the methods proposed by Japanese scientists have several advantages. The periods of natural oscillations for 30 inlets along Kunil-Kamchatka coast are obtained.

GEOGRAPHIC DESCRIPTORS: INW, USSR, Kamchatka

ENVIRONMENT: Marine

IDENTIFIERS: hydrodynamic equations; oscillations

SECTION HEADING CODES: 2167

08583395 208-08395

Effect of source orientation and location in the Aleutian Trench on far-field tsunami amplitude. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Whalin, R.W.; Garcia, A.W.; Butler, H.L.

U.S. Army Eng. Waterways Exper. Stn., Vicksburg, MI, USA

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 141-154

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

An investigation of seismic source orientation and location for tsunami generated in the Aleutian Trench region is undertaken to ascertain the effect on tsunami amplitude near the Pacific coast of the continental United States. The Aleutian Trench is partitioned into 12 distinct segments, and an equal probability of occurrence of an event is assumed for each segment. A hypothetical ground displacement is centered in each segment, and a computation of the wave amplitude is made at various locations near the edge of the continental shelf. Computer graphics are used to contour the ocean surface at fixed times after initial ground displacement, readily depicting directionality of the source. A computation of the 1964 Alaskan tsunami amplitude is made for comparison with that resulting from the hypothetical source placed in each segment. As a result of these computations, it is possible to perform an evaluation of the relative vulnerability of an area (along the west coast of the United States) to tsunami inundation as a function of seismic location in the Aleutian Trench.

GEOGRAPHIC DESCRIPTORS: INE, Aleutian Trench

ENVIRONMENT: Marine

IDENTIFIERS: predictions

SECTION HEADING CODES: 2167

source. Within each ray tube water elevation was calculated by numerical integration of non-linear one-dimensional equations of shallow water. Elevation within the source was taken in the form of half sinusoid. The waves were calculated up to a depth of 10 m. Here and at the walls of ray tubes the condition of complete wave reflection was adopted. For back contour of the source, the condition of free progression was adopted. The coastal zoning according to amplitudes and periods of tsunamis was effected. It is shown that calculations according to Green's formula over-estimate water uplift on coast and give an erroneous distribution along it. It was studied how remoteness, width and orientation of the source influence the form of water elevation near the coast. For Kamchatka Bay two-dimensional integration of linear equations of shallow water was fulfilled, allowing study of the edge wave formation and propagation.

GEOGRAPHIC DESCRIPTORS: INW, USSR, Kamchatka

ENVIRONMENT: Marine

IDENTIFIERS: water circulation; coastal zone

SECTION HEADING CODES: 2167

0858394 208-08394

Runup of single waves on a sloping beach. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Spielvogel, L.O.

Hawaii Inst. Geophysics, Univ. Hawaii, Honolulu, HI 96822, USA

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 113-120

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

Possibilities of high shoreline amplification and runup are investigated. Shoreline amplification of magnitude 5.38 and a tsunamigenic (deep water) amplification of magnitude 5.71 are obtained from single waves without analytic or computational difficulties. It is not claimed that this is a maximum, but rather it is conjectured that arbitrarily high runup and amplification can be obtained provided the correct initial wave trains are chosen.

ENVIRONMENT: Marine

SECTION HEADING CODES: 2167

0858393 208-08393

Materials for preliminary tsunami zonation of Kurile-Kamchatka coast based on hydrodynamical calculations. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Solov'ev, S.L.;

Nekrasov, A.V.;

Bukhteev, V.G.;

Pyaskovsky, R.V.

Sakhalin Complex Sci. Res. Inst., Acad. Sci., Leningrad

Hydrometeorol. Inst., USSR

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 29-38

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The sources of strong Kurile-Kamchatka tsunamis stretch along the Soviet Pacific coast. Water uplift is the greater, the longer the source is, because of smaller scattering of wave fronts. The possibility of tsunami occurrence is nearly equal along the arc. The calculations were carried out for linear source, stretching along the arc at a distance of 70 km off it. Rays were drawn through 16 km, being orthogonal to the

0858392 208-08392

Some recent developments in asymptotic method for tsunami wave propagation. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Shen, M.C.

Dep. Math. and Math. Res. Cent., Univ. Wisconsin, Madison, WI 53706, USA

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974.

Heath, R.A.; Cresswell, M.M. eds)

PUBL: Unesco Press, Paris (France), 1976, p. 19-28

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

As recognized by its effectiveness in dealing with wave propagation on fluid of variable depth, an asymptotic method, the so-called ray method or geometrical optics method, has been advanced in several directions recently. The asymptotic expansion of the ray method involves a phase function and an amplitude function. The phase function is found to satisfy the Hamilton-Jacobi equation, which defines a family of time-space curves called rays, and the amplitude function is then determined by a conservation relation along each ray. The ray method expansion fails at a shoreline and a caustic where the amplitude function becomes infinite. These anomalies are now resolved by uniform asymptotic expansions in terms of special functions. A nonlinear ray method has also been systematically developed such that a nonlinear evolution equation of the Korteweg-DeVries type is derived along each ray.

ENVIRONMENT: Marine

SECTION HEADING CODES: 2167

0858391 208-08391

Tsunami scattering by an island surrounded by water of variable depth. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Shaw, R.P.

Joint Tsunami Res. Effort, NOAA, Univ. Hawaii, Honolulu, HI 96822, USA

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 133-140

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

Several numerical schemes are available for the scattering of time harmonic and transient water waves by islands.

Variable water depth, irregular island shapes, even nonlinear effects may be included in these schemes without changing their basic character as finite difference algebraic equations approximating some governing partial differential equations. However, for an infinite ocean, or at least one large enough to make the use of a finite difference mesh impractical everywhere, these schemes must all be terminated at some fictitious outer boundary. The 'outer boundary condition', which requires a complete system of algebraic equations for solution, is usually approximated on some physical grounds. In essence, a local impedance or relationship between dependent variables and their derivatives is guessed. An alternative method is proposed here in which the outer 'boundary' condition is written exactly for those problems where the water depth beyond this fictitious outer 'boundary' may be taken as constant and where the wave heights may be taken as small enough to justify linearization there. These conditions in fact define the region in which this outer 'boundary' may be drawn. Solutions interior to this 'boundary' proceed by the usual methods. At this 'boundary', the Kirchhoff time-retarded integral or Helmholtz integral equation is used to replace the entire infinite domain of fluid exterior to this 'boundary' by a single equation, involving an integral over the 'boundary' of the dependent variables and their derivatives, i.e., a 'global' impedance matching. This integral equation, which represents the exact relationship between the dependent variables and their derivatives at this 'boundary', may itself be approximated by linear algebraic equations. These equations are coupled to the algebraic equations in the interior domain by use of finite-difference approximations for normal derivatives. The net result is a deterministic set of algebraic equations for values of the dependent variables at the mesh points. Examples are given for the time harmonic case for a constant depth and a parabolic depth variation.

ENVIRONMENT: Marine

IDENTIFIERS: water depth; wave height; fluid dynamics

SECTION HEADING CODES: 2167

0858389 208-08389

Nonlinear evolution of tsunami waves. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Ostrovsky, L.A.; Pelinovsky, E.N.
Radiophys. Res. Inst., Gorky, USSR
, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds

PUBL: Unesco Press, Paris (France), 1976, p. 203-209

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The analysis of wave motion in the beach zone, a comparatively shallow part of the ocean, is one of the most difficult problems of water wave theory and is a rather interesting sphere of application of nonlinear wave general theory. Several factors are taken into account at once: nonlinearity, associated with the finite height of a wave, dispersion due to the finite depth, inhomogeneity (bottom slope) and so on. These factors as a rule influence wave propagation. Recently, notable progress has been achieved in the theory of such processes and the present paper gives a review of the results obtained.

ENVIRONMENT: Marine

SECTION HEADING CODES: 2167

0858389 208-08389

Edge wave generation and associated bay responses. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Olsen, K.H.; Hwang, L.-S.

Univ. California, Los Alamos Sci. Lab., Los Alamos, NM, USA

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds

PUBL: Unesco Press, Paris (France), 1976, p. 253

en.

DOC TYPE: Conference; Summary; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

It has been speculated that edge wave generation and propagation may often play a significant role in near-shore tsunami phenomena. Field observations have been made of this behaviour. The measurements indicate that the waves generated by near-shore ground displacement show a preferential direction of wave propagation along the shore in particular, such displacement plays an important role of exciting nearby bays. In order to understand these effects better, a

theoretical model has been used to calculate the near-field wave pattern resulting from ocean bottom displacements. Directivity of wave propagation and bay response to such waves for idealized bottom geometry is investigated. In addition, this model has also been used to evaluate the wave generation based on the observed ground motion and the actual irregular bottom topography. The results of this calculation were compared with measured wave records and show good agreement.

ENVIRONMENT: Marine

SECTION HEADING CODES: 2167

0858388 208-08388

Shock pressure of tsunami surge on a wall. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Nakamura, S.

Disaster Prevention Res. Inst., Kyoto Univ., Kyoto, Japan

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 177-186

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

This study treats the problem of estimating the shock pressure of a tsunami surge in the form of hydraulic bore on a wall. This is done to obtain a criterion for construction of a wall or gate at a river mouth or on a coast. The study has referred to an assumption of similarity between a bore caused by a dam-breaking and a surging tsunami in a river mouth or beach. At first, the dynamical characteristics of the bore front are studied experimentally for comparison with other theoretical results. Recent work shows that the tip profile of a surge is expressed theoretically by a parabola with an axis corresponding to the horizontal bed and with the influence of bottom friction the results are compared to the experimental results reported here. The comparison suggests that the important factors in the study are velocity of the bore tip, friction at the bed, and scale of the bore source or tsunami surge. The characteristics of the bore reflected at a wall are studied referring to recent study, and the result suggests that the tsunami inundation should be reflected at a location as far as possible from the coast. When one tries to reflect the tsunami surge at a beach or on a dry bed, the height of the reflected bore becomes very large, producing disaster on the coast. The practical problems of bore reflection have also to be considered. The author has traced his application to refine recent theory for estimation of the shock pressure, and to find that the shock pressure depends strongly on the profile of the bore front, i.e. the slope of the wedge of the water mass moving toward the wall.

ENVIRONMENT: Marine

IDENTIFIERS: coastal zone

SECTION HEADING CODES: 2167

0858387 208-08387

Atmospheric acoustic and internal gravity waves and their relevance to tsunami prediction. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Murty, T.S.; Polavarapu, R.J.

Mar. Sci. Dir., Dep. Environ., Ottawa, Que., Canada

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974.

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 99-110

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The concept of earthquake magnitude developed by Richter in the 1930's proved to be useful in seismology, and similar attempts were made in developing a tsunami magnitude scale. However, experience showed that such a tsunami magnitude scale did not work in practice due to the great influence of local topography on tsunami magnitude. At the I.U.G.G. tsunami symposium held at Moscow in August 1971, the consensus of opinion was to abandon the tsunami magnitude scale and develop a tsunami energy scale which might be universally adaptable. It is proposed here that one of the possible approaches to this concept of a tsunami energy scale is to make use of the effects in the atmosphere caused by strong dip-slip earthquakes which are generally believed to be tsunamigenic owing to their predominant vertical faulting. However, to understand the type of wave motions generated in the atmosphere by tsunamigenic earthquakes, one has to determine the atmospheric acoustic-internal gravity wave spectrum due to various energy sources in addition to earthquakes: meteorological disturbances, atmospheric nuclear explosions, volcanic explosions, solar eclipses, sonic booms, rocket launches, etc. In this review paper, the spectrum due to these various perturbations was systematically examined it appears that the atmospheric internal gravity waves in the 10- to 15-min period range might be useful for tsunami energy estimation purposes.

ENVIRONMENT: Marine

IDENTIFIERS: Internal waves; acoustics

SECTION HEADING CODES: 2167

0858385 208-08385

Source mechanism of earthquake and tsunami generation: a review. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Kajiura, K.
Earthquake Res. Inst., Univ. Tokyo, Tokyo, Japan
, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 231-249

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

Recent studies made in the Earthquake Research Institute related to tsunami generation are reviewed. Major topics are - (1) The regularity found in the seismicity of great shallow earthquakes (2) The estimation of fault-origin models of major earthquakes in Japan (3) The comparison of the crustal deformation deduced from seismological, geodetic, and tsunami data, and (4) Tsunami computation based on a fault-origin model of an earthquake. Comparison of source parameters or tsunami estimated from seismological data and from tsunami data indicates good correspondence in ordinary earthquakes (the elastic rebound theory holds) and provides a physical basis for the already known statistical relationships between earthquake and tsunami. The large deviation from these statistical relationships may indicate the inelastic nature of the crustal deformation accompanying the earthquake. In particular, the characteristics of an unusual earthquake - tsunami earthquake after Kanamori - are explained, the magnitude of this earthquake is relatively small but the generated tsunami is very large.

ENVIRONMENT: Marine

SECTION HEADING CODES: 2167

0858384 208-08384

Tsunami numerical modeling and its application. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Hwang, L.-S.; Divoky, D.; Butler, H.L.

Tetra Tech, Incorporated, 630 N. Rosemead Blvd, Pasadena, CA, USA

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974.

Heath, R.A.; Cresswell, M.M. eds)

PUBL: Unesco Press, Paris (France), 1976, p. 227

en.

DOC TYPE: Conference; Summary; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The sporadic recurrence of destructive tsunamis primarily within the Pacific Ocean creates a vital need for quantitative, early projections of distant coastal effects. This will require rapid estimates of the nature of tectonic displacement, a deterministic method to evaluate the resulting wave train, and techniques to predict local coastal behaviour. A tsunami numerical model for calculating wave generation, transoceanic propagation and coastal response is developed. Results of computation are compared with field measurements both in deep water (Wake Island deep-water gauge records of 1964 Alaskan Tsunami) and in harbour (at Hilo Harbour, Hawaii) and showed remarkable agreements. Based on the calculated results, explanations of excessive damage at Crescent City, California, in the 1964 Alaskan Tsunami and at the Coast of Japan in the 1960 Chilean Tsunami are presented. Finally, brief discussions of how to utilise this model for improving tsunami warning systems and providing a tsunami design criteria for coastal structures are given.

GEOGRAPHIC DESCRIPTORS: I, Pacific

ENVIRONMENT: Marine

IDENTIFIERS: coastal zone

SECTION HEADING CODES: 2167

0858382 208-08382

Tsunamis in a stratified ocean. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.
Ham Mack, J.L.
W.M. Keck Laboratory of Hydraulics and Water Resources, California Inst. Technol., Pasadena, CA 91109, USA
(no. 15)

Bull. R. Soc. N.Z.
In: Tsunami Research Symposium 1974
Heath, R.A.; Cresswell, M.M. eds)
PUBL: Unesco Press, Paris (France), 1976, p. 225
en.

DOC TYPE: Conference; Summary; Book
REPORT NO.: ISBN: 92-3-101330-0
JOURNAL ANNOUNCEMENT: 7812

The surface and internal waves generated in a density-stratified fluid domain by a deformation of the bounding solid boundary are investigated both theoretically and experimentally. The fluid domain is assumed to be two-dimensional with a uniform depth and infinite lateral extent. The modeled variation of density, ρ , with depth consists of two layers of different but constant density (gravitationally stable), separated by a thin interfacial region where large density gradients occur. Results are presented for a specific deformation of the bed consisting of a block section which displaces vertically either up or down according to a prescribed time-displacement history.

ENVIRONMENT: Marine

SECTION HEADING CODES: 2167

0858383 208-08383

Tsunami off the Nemuro peninsula in June 1973, and the tsunami generation in east Hokkaido. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Hatori, T.
Earthquake Res. Inst., Univ. Tokyo, Tokyo, Japan
(no. 15)

Bull. R. Soc. N.Z.
In: Tsunami Research Symposium 1974
Heath, R.A.; Cresswell, M.M. eds.)
PUBL: Unesco Press, Paris (France), 1976, p. 61-70
En en.

DOC TYPE: Conference; Book
REPORT NO.: ISBN: 92-3-101330-0
JOURNAL ANNOUNCEMENT: 7812

Based on tide gauge records, the tsunamis accompanying the main shock ($M = 7.4$, JMA) on June 17 and the largest aftershock ($M = 7.1$, JMA) on June 24, 1973, off the Nemuro peninsula are investigated. The ocean bottom in the tsunami sources may be uplifted, judging from the upward initial wave motion. The estimated source area of tsunami agrees well with the aftershock area. The source length of the main tsunami is inferred to be 130 km parallel to the Nemuro peninsula, and the area is $7.2 \times 10^5 \text{ km}^2$. The average sea level disturbance of 35 cm might have been generated in the source area to account for the observed initial wave heights. The source area of the second tsunami (June 24) lies in the east side of the main source area. Adding the data of visual observations, the source area of the 1952 Tokachi-oki tsunami is newly estimated. The source length is 160 km and its area is $8.8 \times 10^5 \text{ km}^2$. The average sea level disturbance at the source seems to be about 45 cm. The newly estimated source of the 1969 Shikotan tsunami agrees well with the aftershock area, extending 200 km parallel to the Kuril Trench. The sea bottom at the land side of the tsunami source may be subsided, because the downward motion of the initial wave was observed at the Hokkaido and Kuril tide stations. The calculated sea level disturbance at the source is about 40 cm. The 1973 tsunami was generated in the same region as the tsunami on March 22, 1894 and the source area lies between the 1952 Tokachi-oki and the 1969 Shikotan tsunami sources. However, wave energy of the 1973 tsunami is one-fifth of the 1894 tsunami. The source dimension is one-half, judging from the different travel times observed at Ayukawa. The space-time diagram of tsunami activity suggest that the area to the southwest of the 1973 tsunami may be a region of relatively high tsunami risk.

GEOGRAPHIC DESCRIPTORS: INW, Japan, Hokkaido

ENVIRONMENT: Marine

IDENTIFIERS: wave energy; tide gauge; wave height

SECTION HEADING CODES: 2167

0858381 208-08381

Tsunami runup predictions for southern California coastal communities, U.S.A. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Garcia, A.W.; Houston, J.R.

U.S. Army Eng. Waterways Exp. Stn. Vicksburg, MS, USA

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds

PUBL: Publ.by: Unesco Press, Paris (France), 1976, p. 5-18

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

Predictions are made for the maximum runup resulting from tsunamis of distant origin for periods of occurrence of 100 and 500 years for several coastal communities in southern California. Tsunami source regions in both northern and southern hemispheres are considered. Statistical effects of the astronomical tide are taken into consideration in prediction of tsunami runup. Historical evidence is used to delineate known tsunamigenic geographical regions which produce significant runup along the coastal reaches of interest. Numerical simulation of the generation and propagation of numerous tsunamis uses a hypothetical and reproducible ground displacement distributed along these known tsunamigenic regions to calculate the effects of distance and directionality. Analytical techniques are used to propagate the wave over the shoaling region representing the continental shelf. The finite element method is used to obtain estimates of the periods of the resonant modes of oscillation at those locations where historical evidence has indicated that resonance significantly amplifies the local wave amplitude. Comparisons are presented showing good agreement of data recorded at tide gauges along the west coast of the United States during the tsunami generated by the 1964 Alaska earthquake with predicted results of the simulation of this tsunami.

GEOGRAPHIC DESCRIPTORS: INE, USA, California

ENVIRONMENT: Marine

SECTION HEADING CODES: 2167

0858380 208-08380

Tsunami propagation and its response to the shoaling areas. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Chen, M.H.T.

Hawaii Inst. Geophys., Univ. Hawaii, Honolulu, HI, USA

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds

PUBL: Unesco Press, Paris (France), 1976, p. 229

En en.

DOC TYPE: Conference; Summary; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

Expressing the governing equations of the linearized long-wave theory by an alternate-direction explicit scheme, a numerical model is developed to study tsunami propagation across an ocean. A suitable boundary condition equivalent to the matched impedance boundary condition in acoustic radiation is adapted to describe the open sea boundary where the wave is assumed to be totally transmitted. Applying the concept of open boundary, it is possible to investigate wave response in a particular area without having to cover the entire ocean. The model is first used to solve the time-harmonic steady-state problem such as a periodic long wave impinging upon a circular island with uniform water depth. Good agreement is found between the predicted and analytic solutions of the wave amplitude at the shoreline of the island. The destructive tsunami that resulted from the 1964 Alaska earthquake is simulated by a numerical code in spherical coordinates. In general, the predicted first arrival time is approximately 30 minutes earlier than the recorded values. This discrepancy is due to the treatment for the shoaling area, which becomes critical when the spatial grid is 1.degree. by 1.degree. for the model. The wave build-up at Crescent City and Hilo was due to local amplification, and each should be examined separately. The predicted wave behaviour for the selected station tends to agree with the recorded results.

ENVIRONMENT: Marine

SECTION HEADING CODES: 2167

0858379 208-08379

Numerical investigation of nonlinear tsunami waves in a basin of varying depth. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Cherkesov, L.V.; Knysh, V.V.

Mar. Hydrophys. Inst., Ukrainian Acad. Sci., Sevastopol, USSR

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 191-200

En. en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The paper investigates, using the numerical methods of characteristics, the deformation of a nonlinear tsunami wave while it travels from a deep-water ocean area towards the coastline. The depth in the open ocean is supposed to be constant depths of the continental slope and shelf area vary according to the linear law, each having its own angle of incline. Effects of nonlinear terms of equations of motion, the angle of bottom incline of the shelf area and the forms of initial elevation on the energy of a leading wave and the distribution of energy over wave body, on the amplitude and form a leading wave in the process of its travelling till destruction have been studied. The field of application of linear theory is determined on a basis of analysis of results of numerical experiments with and without regard for nonlinear terms.

ENVIRONMENT: Marine

IDENTIFIERS: wave energy

SECTION HEADING CODES: 2167

0858378 208-08378

Tsunamis - a review of current understanding. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Carrier, G.F.

Harvard Univ., Cambridge, MA 02138, USA

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds)

PUBL: Unesco Press, Paris (France), 1976, p. 221

en.

DOC TYPE: Conference; Summary; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The generation, propagation, and run-up phenomena associated with tsunamis depend on a variety of mechanisms and geometric

influences. Insight into the roles played by these individual contributions can be inferred from a variety of special theories. This paper contains a review of the way in which the current general understanding is provided by these theories, some comments on the relationship of such theories to current computational capabilities, and a brief discussion of some still-challenging questions. Emphasis is placed on the parameter ranges in which particularly pertinent features of the propagation and run-up were to be expected.

ENVIRONMENT: Marine

SECTION HEADING CODES: 2167

0858377 208-08377

Tsunami response of a multiple island system modeling the Hawaiian Islands. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington, (New Zealand) 29 Jan 1974

Bernard, E.N.

Joint Tsunami Research Effort, NOAA, 2525 Cornea Road, Honolulu, HI 96822, USA

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds)

PUBL: Unesco Press, Paris (France), 1976, p. 83

en.

DOC TYPE: Conference; Summary; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The response of linearized long waves to the Hawaiian Islands is investigated numerically using the actual topography of the islands. A time-marching procedure is used to evaluate the wave field by the linear, frictionless, incompressible, Eulerian equation of motion and continuity in Cartesian coordinates. The condition of non-normal flow is employed at the island shoreline, and a localized extrapolation technique is used at the outer boundary to simulate a free-flow boundary. A computerized system of real topographic data is described. Verification of the numerical procedure was accomplished by agreement with analytic solutions of steady-state problems involving wave interactions with geometric islands in both constant and variable depth cases. Tests show quantitative agreement with theory for both cases. The case of a tsunami approaching from the north has been accomplished using a singular Gaussian pulse disturbance (120 km in length). Examination of resulting wave records indicates credibility in the overall system. Time series analysis is being conducted on these wave records to derive a response relationship among interacting islands. Upon completion, similar analysis will be used for response to tsunamis from various directions.

GEOGRAPHIC DESCRIPTORS: ISE, Hawaii

ENVIRONMENT: Marine

SECTION HEADING CODES: 2167

0858376 208-08376

Numerical modelling of tsunami and seismic surface wave generation by a submarine earthquake. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Alexeev, A.S.; Gusiakov, V.K.

Computer Cent., Siberian Branch of Acad. Sci., Novosibirsk, USSR

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976, p. 243-252

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The generation of gravity and elastic waves in a layer of the homogeneous compressible gravitating liquid overlaying the homogeneous elastic halfspace is examined. The model source, having some properties of a real source of an earthquake, is within the elastic halfspace. The exact mathematical solution of the problem is found, and the dispersion curves of phase and group velocity, amplitude spectra and theoretical seismograms for displacements in a gravity, hydroacoustic and seismic surface waves are calculated. Physical and numerical analysis is carried out for conditions of tsunami generation taking into consideration the depth and dimensions of the source, direction of the fault, and the rupture-velocity. It is shown that under certain combinations of source parameters the earthquakes become highly tsunamigenic. The possibility of using hydroacoustic and seismic surface waves for tsunami prediction is evaluated.

ENVIRONMENT: Marine

IDENTIFIERS: seismic waves

SECTION HEADING CODES: 2167

0858375 208-08375

Tsunami and earthquake faulting. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Abe, K.

Dep. Geophys., Fac. Sci., Hokkaido Univ., Sapporo 060, Japan
(no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds)

PUBL: Unesco Press, Paris (France), 1976, p. 241

LANGUAGES: Polish

en.

DOC TYPE: Conference; Summary; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The relation between tsunamis and sea-bottom deformations associated with great earthquakes is studied on the basis of a fairly complete set of seismological and tsunami data. The seismic results are included in the calculation of static crystal deformations. The calculated deformations are compared with the tsunami source area as obtained by the inverse refraction diagram, the first motion of tsunami waves, and the height of the sea-level disturbance at the source. It is found that such deformations as predicted by the seismic results can quantitatively explain the source parameters of tsunamis. These findings strongly favour the idea that tsunamis are generated by tectonic deformations rather than by submarine landslides and slumps. A precise determination of the tsunami source parameters provides a valuable method for estimating the extent of faulting in submarine earthquakes.

ENVIRONMENT: Marine

IDENTIFIERS: tectonics

SECTION HEADING CODES: 2167

bottom profile and is assumed to rotate with uniform angular velocity. The deep and shallow parts of the basin are both semi-infinite and of constant depth. The transitional area which models the continental slope is represented by an arbitrary continuous monotonic function. In order to consider energy dissipation, it is assumed that there is no reflected wave. Within the framework of linear long wave theory, an algorithm is presented for calculation of the amplification of the transmitted wave, amplification resulting from the passage of the wave over the region of variable depth. Numerical results were obtained for a concrete example. The maximum amplification ratio of the incoming wave amplitude has been evaluated analytically for an arbitrary monotonic profile in the transitional area. This maximum amplification ratio wave has been evaluated for incoming waves of frequencies higher than the inertial frequency and under the assumption that non-linear effects do not occur in the shallow shelf region.

ENVIRONMENT: Marine

IDENTIFIERS: energy transfer

SECTION HEADING CODES: 2163

0858345 208-08345

Long wave intensification due to the influence of bottom topography. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Voyt, S.S.; Sebekin, B.I.

Inst. Oceanol., Acad. Sci., Moscow J-387, USSR

(no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds)

PUBL: Unesco Press, Paris (France), 1976, p. 201

en.

DOC TYPE: Conference; Summary; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The problem investigated is the increase in amplitude of waves travelling from the open ocean over the continental slope into a shelf. The basin considered has a cylindrical

0858344 208-08344

Particularities of long wave propagation in ocean basins. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Lebedev, A.N.; Sebekin, B.I.
Inst. Oceanol., Moscow, USSR
, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 187-190

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The problem of the influence of a variable horizontal component of Coriolis force on the propagation of long waves is investigated. Taking account of the rotation and spherical form of the earth, it is proposed to derive a procedure for obtaining exact plane analogues of the unsteady tidal equations on the rotating sphere. The space and time criteria of the precision of the hierarchy of the approximate equations are obtained. The natural space parameter is the ratio of the characteristic scale of the basin to the earth's radius, and the time parameter is the ratio of characteristic period of oscillations to the pendulum day. Within the limits of this model, which is reasonably exact for the basin with sizes not exceeding the earth's radius, the Green function for the frequency spectrum of the tsunami waves is obtained. The mathematical problem consists in the consideration of the system of the partial derivative equations with varying coefficients. For the investigation of the radiation condition problem, a method of successive passing from one step to the lower one in the hierarchy of approximate equations is proposed, which permits determining the unique solution. This method is based on the necessary continuous dependence of the solution of all physical parameters.

ENVIRONMENT: Marine

IDENTIFIERS: tsunamis; Green's function; models

SECTION HEADING CODES: 2163

0858343 208-08343

Electromodeling of finite-amplitude water waves. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Gorshkov, K.A.; Ostrovsky, L.A.; Papko, V.V.;
Pelinovsky, E.N.
Radiophys. Res. Inst., Gorki, USSR
, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 123-132

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The analogy is established between equations of nonlinear waves in electromagnetic systems and of long finite-amplitude water waves. The results of electromodeling the following processes are presented: (a) nonlinear wave profile deformation on the surface of a shallow basin and formation of bore (b) formation and interaction of stationary solitary waves (c) decay of the localized perturbation into a set of solitary waves (d) attenuation of nonlinear waves (e) transformation of a solitary wave due to the slopes of a bottom (f) generation of solitary waves in bounded systems. The experimental data agree with theoretical results.

ENVIRONMENT: Marine

SECTION HEADING CODES: 2163

0858338 208-08338

Practical calculation of long wave reflection from the bottom slope. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974

Nekrasov, A.V.

Leningrad Hydrometeorol. Inst., Leningrad, USSR
, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 159-164

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

A method of calculation of long wave reflection applicable to a bottom profile of arbitrary form is given. This method is restricted by the requirement of linearity but at the top of the continental slope this non-linearity can usually be neglected.

ENVIRONMENT: Marine

IDENTIFIERS: hydrodynamic equations

SECTION HEADING CODES: 2162

0858337 208-08337

Solution of the linear, long-wave hydrodynamic equations by using unit impulse functions. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Loomis, H.G.

Joint Tsunami Res. Effort, NOAA, Univ. Hawaii, Honolulu, HI 96822, USA

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 155-158

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

A method of running the solutions to the linear long-wave equations when a unit impulse is applied, is presented. The complete solution which is the linear combination of the individual solutions relies on the fact that this is also a solution to the linear equations.

ENVIRONMENT: Marine

SECTION HEADING CODES: 2162

0858335 208-08335

Experimental study of solitary tsunami waves. Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Kononkova, G.E.; Reihrudel, A.E.

Dep. Phys. of Sea and Land Waters, Moscow State Univ.,

Leninskie Gory, Moscow, USSR

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds.)

PUBL: Unesco Press, Paris (France), 1976., p. 213-220

En en.

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

Results of studying experimentally the effects of bottom friction on a solitary tsunami wave, kinematics of the wave and magnitude of the run-up velocity together with the type of transformation resulting when the wave approaches a barrier are presented.

ENVIRONMENT: Marine

SECTION HEADING CODES: 2162

Presented at: International Union of Geodesy and Geophysics Tsunami Committee Meeting and Symposium Wellington (New Zealand) 29 Jan 1974.

Miller, G.R.

Joint Tsunami Research Effort, NOAA, Univ. Hawaii, Honolulu, HI 96822, USA

, (no. 15)

Bull. R. Soc. N.Z.

In: Tsunami Research Symposium 1974

Heath, R.A.; Cresswell, M.M. eds)

PUBL: Unesco Press, Paris (France), 1976, p. 121

en.

DOC TYPE: Conference; Summary; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

In an earlier paper by Vitousek and Miller (1970) a description of an instrumentation system for measuring tsunamis in the deep ocean was given. The system is designed to transmit water pressure data from the sea floor to the surface as an interval between two pulses. Upon acoustic query from the surface the bottom unit was designed to respond with the data readout and to initiate the taking of a new pressure reading. The unit was installed under Ocean Station Papa (Lat. 50.degree.N., Long. 145.degree.W.) in a cooperative program with Dr. John Garrett of the Canadian Department of Environment. Due to an unforeseen coincidence the bottom unit became 'self-querying' upon emplacement thus it operated continuously, which greatly shortened the battery life of the system. During the two months the system was functional, data were recorded at the surface - mostly during daylight hours. A tide record was obtained, but no tsunami occurred during the recording span.

ENVIRONMENT: Marine

SECTION HEADING CODES: 2144

0858279 208-08279

Tidal data from the deep ocean tsunami reporting system.

0858255 208-08255

Bull. R. Soc. N.Z.
Tsunami Research Symposium 1974. Proceedings of:
International Union of Geodesy and Geophysics Tsunami
Committee Meeting and Symposium Wellington (New Zealand) 29
Jan 1974.
Heath, R.A.; Cresswell, M.M.
eds.
(no. 15)

PUBL: Unesco Press, Paris (France), 1976., 258 p.

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Conference; Book

REPORT NO.: ISBN: 92-3-101330-0

JOURNAL ANNOUNCEMENT: 7812

The proceedings contain papers and abstracts of papers
presented at the 1974 symposium. Papers were presented under
four broad headings: tsunami run-up, tsunami instrumentation
and experiments, tsunami propagation, and tsunami generation.
The papers are cited individually and appear in this issue of
ASFA 2.

GEOGRAPHIC DESCRIPTORS: New Zealand, Wellington

ENVIRONMENT: Marine

SECTION HEADING CODES: 2106

0857716 208-07716

Dispersion and nonlinearity in tsunami computation.

Shuto, N.

Dep. Civ. Eng., Tohoku Univ., Tohoku, Japan

Coast. Eng. Jap., v.20, 16-25, (1977)

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7811

A simple analytical method is proposed to evaluate the
magnitude of the nonlinear term in comparison with the linear
term and that of the dispersion in comparison with the
nonlinear term, in the computation of tsunamis. It is
concluded that along the Sanriku coast which is frequently
attacked by tsunamis, no dispersion is required.

DESCRIPTORS: tsunamis; computation; dispersion

GEOGRAPHIC DESCRIPTORS: INW, Japan, Sanriku

ENVIRONMENT: Marine

IDENTIFIERS: mathematical models

SECTION HEADING CODES: 2167

0857714 208-07714

JOURNAL ANNOUNCEMENT: 7811

DESCRIPTORS: tsunamis; power plants

GEOGRAPHIC DESCRIPTORS: ANE, Portugal

IDENTIFIERS: nuclear energy

SECTION HEADING CODES: 2167

0857703 208-07703

Tsunamis and the San Francisco Bay area. Coastal zone '78
San Francisco, CA (USA) 14 Mar 1978

Williams, J.W.

San Jose State Univ., Dep. Geol., San Jose, CA, USA

PUBL: American Society of Civil Engineers, New York, NY

(USA), 1978, (3), 1803-1817

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Conference; Book

JOURNAL ANNOUNCEMENT: 7811

A frequency distribution curve based on an adequate
historical record can be used for the prediction of tsunami
wave heights. Analysis of the historical record for the
entrance to San Francisco Bay suggests that the
one-hundred-year tsunami event has a wave height of 1.9
meters. This historical approach to tsunami wave height
prediction in areas where an adequate data base exists is
relatively unsophisticated, inexpensive, and the results are
likely to be believed by the general public. The results of
this study are in general agreement with predictions made
using various techniques including computer models of tsunami
generating areas.

GEOGRAPHIC DESCRIPTORS: INE, San Francisco Bay

SECTION HEADING CODES: 2167

0857625 208-07625

An experimental study of tsunami run-up on uniform slopes.

Togashi, H.; Nakamura, T.
Dep. Civ. Eng., Nagasaki Univ., Nagasaki, Japan
Coast. Eng. Jap., v.20, 95-108, (1977)
LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7811

The empirical equations of tsunami run-up height by Kaplan are well known so far, but there are problems in practical applications for example, it is not valid to compute run-up heights in the field by extrapolating Kaplan's formulae beyond their experimental range, using them together with Green's law. Therefore in the present paper, the applicability of Kaplan's formulae is experimentally reinvestigated at first over a wider range of wave steepness than Kaplan's. The authors' experiments are performed on uniform slopes of $S = 1/40$ and $1/60$. One of the present authors has carried out the same experiments for different conditions, in which the slopes were $S = 1/20$, $1/30$ and $1/50$. All these experimental results of run-up height are compared with Kaplan's formulae on the theoretical equations of linear shallow water waves given by Keller, and Keller and Shuto. Furthermore, the relationship between Kaplan's formulae and Green's law is studied theoretically and the deficiency of Kaplan's method of calculation is deduced. After the discussion of the applicability of the linear theories, the authors present a new empirical formula to estimate the run-up height. Finally, the reflection coefficient of long waves from the slope is investigated experimentally and compared with Shuto's breaking condition.

DESCRIPTORS: tsunamis; wave run-up

ENVIRONMENT: Marine

IDENTIFIERS: gradients; mathematical models; reflection

SECTION HEADING CODES: 2149

0857341 208-07341

Summary Rep. IOC

Summary report. Sixth session of the International Co-ordination Group for the Tsunami Warning System in the Pacific. Manila, 20-25 February 1978, 6. Sess. International Co-ordination Group for the Tsunami Warning System in the Pacific. Manila (Philippines). 20 Feb 1978.
Intergovernmental Oceanographic Commission, Paris (France)

PUBL: TSU-V, /3.

LANGUAGES: English

SUMMARY LANGUAGES: Spanish; French; Russian

Includes programme and budget forecast 1981/82

DOC TYPE: Conference; Book

JOURNAL ANNOUNCEMENT: 7810

The report is a summary of the sixth session of the 15 member state international co-ordination group for the Tsunami Warning System in the Pacific (TWS) to review the present

status of the programme and to recommend further action. Activity reports were presented by the IOC International Tsunami Information Centre (ITIC) and member states. New activities considered and acted upon by the group were: further expansion of IWS technical improvements in the system, including communications the need for continuous research on tsunamis and, the need to increase public awareness on tsunamis dangers through a broad education programme.

GEOGRAPHIC DESCRIPTORS: Philippines, Manila; I, Pacific
SECTION HEADING CODES: 2392; 2167; 2243; 2106

0857207 208-07207

Environmental mapping of a glacierized coast, Icy Bay, northeast Gulf of Alaska. Presented at: 3. Annual Meest, Icy Bay, northeast Gulf of Alaska.

Boothroyd, J.C.

Dep. Geol., Univ. Rhode Island, Kingston, RI 02881, USA

Coastal Society (USA).

LANGUAGES: English

Summary only.

DOC TYPE: Conference; Summary; Book

JOURNAL ANNOUNCEMENT: 7810

Icy Bay, Northeast Gulf of Alaska, uncovered by recession of Neoglacial ice within the last 75 years, is bounded by a complex mix of still-active glacial, as well as coastal, depositional environments. Satellite imagery, aerial photography (vertical and low-oblique), and field study has led to the delineation of four major depositional systems and over 35 subenvironments along the east side of the Bay. Major systems are active/stagnant glacial ice fluvial-deltaic, including ice-contact and proglacial moraine/till and shoreline. An environmental geologic map (scale 1:10,000) and derivative maps (scale variable) have been prepared to illustrate the depositional systems, as well as geologic hazards such as: glacier-burst flood pathways, unstable areas subject to mass movement and slope failure, and points of severe coastal erosion and storm/tsunami flooding. The east side of the Bay is being considered as a potential site for anchorages and shore facilities to support OCS (outer continental shelf) oil and gas exploration and development in lease areas nearby. These maps aid in assessing the potential environmental impact of OCS activities, and also serve as prototypes of one type of data base needed for land-use planning within the glacierized coastal zone.

GEOGRAPHIC DESCRIPTORS: PNW, USA, Alaska, Icy Bay

ENVIRONMENT: Marine; Brackish

IDENTIFIERS: remote sensing; satellites; river discharge; flooding; coastal erosion; tsunami; storms

SECTION HEADING CODES: 2271; 2264; 2405

0857202 208-07202

Effects of a major earthquake near Bougainville, 20 July 1975.

Everingham, I.B.; Gaul, B.; Dent, V.

Address not stated

Bur. Miner. Resour. J. Aust. Geol. Geophys., 2(4), 305-310, (1977)

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7810

On 20 July 1975 a major earthquake (MS7.9) shook the northern islands of the Solomon Islands chain. Damage amounting to at least \$300,000 (Australian) occurred in the southern Bougainville/Shortland Islands region, where earthquake intensities were estimated to be MMVII-VIII. A tsunami with maximum amplitude of about two metres followed the earthquake and caused further damage. The earthquake caused landsliding, liquefaction, subsidence, slumping of roads and wharfs, and damage to villages, small government and mission buildings, and to the mining installations at Panguna. Aftershock epicentres were in a roughly elliptical area of 12 500 square kilometres off the southwestern coast of Bougainville. Focal depths were in the range 30-70 km. A fault-plane solution and the pattern of aftershocks indicate that the principle earthquake was associated with underthrusting of the Solomon Sea crust beneath Bougainville, in a northeasterly direction and with a dip of about 37.degree.. The faulting associated with the 20 July 1975 earthquake appears to be the extension of faulting associated with a 1974 earthquake series. An aseismic zone, centred at 6.degree.S,154.degree.E, exists immediately northwest of the 1975 earthquake fault zone, between zones where major earthquakes have occurred since 1970. It is considered to be a likely place for a major earthquake in future.

DESCRIPTORS: tsunami; earthquakes; subduction

GEOGRAPHIC DESCRIPTORS: ISEW, Solomon Is.

ENVIRONMENT: Marine

IDENTIFIERS: faults

SECTION HEADING CODES: 2270

0856479 208-06479

Seismicity of the Beaufort Sea, Bering Sea and Gulf of Alaska.

Meyers, H.

NOAA, Environ. Data Serv., Natl. Geophys. Solar-Terr. Data Cent., Boulder, CO, USA

In: Environmental assessment of the Alaskan continental shelf. Volume 17. hazards.

U.S. National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Research Laboratories

, Mar 1977., p. 627-629

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Report

REPORT NO.: NOAA/ERL-AR-77-17

JOURNAL ANNOUNCEMENT: 7809

The Alaskan region is one of the most seismic regions in the world. The location and design of drilling platforms, pipelines, storage and support facilities will have to take this factor into consideration. The objective of this research is to compile a historical file of earthquake data and present it in a fashion which would permit independent assessment of the seismic risk for various localities in Alaska. Three publications have been produced to date: 'A Historical Summary of Earthquake Epicenters in and Near Alaska', April 1976, NOAA Technical Memorandum EDS, NGSDC-1 'Catalog of Tsunamis in Alaska, Revised 1976', March 1976, Report SE-1 and 'An Analysis of Earthquake Intensities and Recurrence Rates in and Near Alaska', October 1976, NOAA Technical Memorandum EDS NGSDC-3.

DESCRIPTORS: seismology; oil and gas exploration

GEOGRAPHIC DESCRIPTORS: PNW, Beaufort Sea; INE, Alaska Gulf; INE, Bering Sea

ENVIRONMENT: Marine

IDENTIFIERS: marine technology; pipelines; tsunamis

SECTION HEADING CODES: 2270

0856232 208-06232

Interaction of tsunamis with the Hawaiian Islands calculated by a finite-element numerical model.
Houston, J.R.

Waterw. Exp. Stn., Vicksburg, MS 39810, USA

J. Phys. Oceanogr., 8(1), 93-102, (1978)

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7809

A finite-element numerical model is used to determine the interaction of tsunamis with the Hawaiian Islands. The model employs a finite-element grid which telescopes from a large cell size in the deep ocean to a very small size in shallow coastal waters and covers a region which includes the eight major islands of the Hawaiian Islands. The numerical model solves the problem of tsunami propagation from the deep ocean to the coasts of these islands. Although time periodic motion is assumed in the solution, the interaction of an arbitrary tsunami waveform with the islands can easily be determined within the framework of a linear theory by superposition. The deep-ocean waveforms of the 1960 and 1964 Alaskan tsunamis are determined for use as input to verify the finite-element model by employing a finite-difference numerical model which assumes as an initial condition that the uplift movement of the sea floor in the source region during an earthquake is instantaneous and results in a water surface elevation identical to the known permanent vertical displacement of the sea floor. The finite-difference model propagates the waves radiated from the source regions to a deep-ocean area near the Hawaiian Islands using a two-dimensional spherical coordinate grid to solve the linear longwave equations. The finite-element model is verified by determining time history responses at coastal locations using these deep-water time histories as input. Numerical model calculations are shown to be in good agreement with tide gage recordings of the 1964 Alaskan tsunami at Kanehuli, Maui, Honolulu, Oahu and Hilo, Hawaii and the 1960 Chilean tsunami at Honolulu, which was the only location where the 1960 tsunami did not destroy the gage.

DESCRIPTORS: tsunamis; mathematical models; shallow water

GEOGRAPHIC DESCRIPTORS: ISE, Hawaii

ENVIRONMENT: Marine

SECTION HEADING CODES: 2162

0855532 208-05532

Manuscr. Rep. Ser. Mar. Sci. Dir. (Can.)

Proceedings. Symposium on tsunamis. Centro de Investigacion Cientifica y de Educacion Superior de Ensenada, Baja California, Mexico, March 23-26, 1977. Symp. on Tsunamis Baja California (Mexico) 23 Mar 1977

ICSU International Union of Geodesy and Geophysics, Baja California (Mexico). Tsunami Committee

, (no. 48)

, 1978., 285 p.

LANGUAGES: English

DOC TYPE: Conference; Report

JOURNAL ANNOUNCEMENT: 7808

This report is a summary of the papers presented at the Tsunami Symposium held at Ensenada during March 23-26, 1977. Fault models and tsunami generation mechanisms were discussed through analytical and numerical models. The results from the joint USA-USSR 1975 tsunami expedition were also presented. Several papers were devoted to descriptive and statistical studies. Tsunami recurrence studies making use of the theory of extremes were reported. Several theoretical papers dealing with tsunami propagation, dispersion, directivity, resonance and run-up were included. Special emphasis was given to tsunami mid-ocean problems, instrumentation and hydraulic experiments. One particular and somewhat new feature, is the series of papers on tsunami interaction with coastal structures and on socioeconomic problems.

GEOGRAPHIC DESCRIPTORS: Mexico Baja California

ENVIRONMENT: Marine

IDENTIFIERS: seismology; mathematical models; international cooperation; statistical analysis; seismic activity; seismic refraction; hydraulics; equipment; sociological aspects; economics

SECTION HEADING CODES: 2167

0854761 208-04761

Is the earth a giant methane store?

Lewis, R.S.

Address not stated

New Scientist, 78(1101), 277, (1978)

LANGUAGES: English

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7807

The possibility that there is a vast reservoir of primordial methane left over from the formation of the Earth in the lower crust has been suggested by Dr. Thomas Gold, of Cornell University. Gold contended that methane trapped at high pressure in the crust has been the main source of carbon on the Earth's surface throughout geologic time. He attacked the more conventional explanation that the source was carbon dioxide from volcanoes. Evidence for the widespread existence of methane in the crust is the source of sheets of flame, torch-like flares and violent explosions that accompany earthquakes. Ground waves, in which the surface rises and falls like ocean swells, and galloping ground motions that are associated with earthquakes can be explained by the release of large volumes of methane. So can the displacement of the underground water table, a well known effect. Gold suggested that a massive release of subterranean gases by an earthquake is a more likely explanation of the tsunami - than that of sea floor displacement. To account for the energy of the tsunami, the sea floor displacement would have to be a massive one, whereas the release of a large volume of gas beneath the sea would produce the safe effect with less energy. In fact the sea wave volume would be equal to the gas volume when the gas has expanded at most to atmospheric pressure. In the ocean, the tsunami may be considered the sea equivalent of the galloping ground phenomenon in earthquakes. Global surveys of atmospheric methane show a higher concentration of the gas in northern high latitudes than in those of the southern hemisphere. There appears to be an unexplained source of methane in the northern Pacific Ocean. It may be related, he said, to higher tectonic activity in the northern high latitudes, compared with stability in the south. Gold speculated that if methane has been the source of all or most surface carbon, the original reservoir would have been of the order of 20 million years of present day fuel usage.

DESCRIPTORS: methane; tsunamis; natural resources;

Earth crust

IDENTIFIERS: earthquakes; I, Pacific

SECTION HEADING CODES: 2261; 2401

0854565 208-04565

Historical study of tsunamis - an outline.

Wigen, S.O.

Pac. Mar. Sci. Rep. Inst. Ocean Sci., (no. 78-5)

PUBL: Institute of Ocean Sciences, Patricia Bay, Sidney,

B.C. (Canada), Jan 1978, 23p.

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Report

JOURNAL ANNOUNCEMENT: 7807

The paper is intended to set forth objectives for a Historical Study of Tsunamis to summarize the preparatory work carried out at the International Tsunami Information Center and to provide a procedural outline for those participating in the study.

DESCRIPTORS: tsunamis; historical account; proposed

research

GEOGRAPHIC DESCRIPTORS: I, Pacific

ENVIRONMENT: Marine

IDENTIFIERS: coastal zone; sociological aspects; tide

tables; methodology; technology

SECTION HEADING CODES: 2167

0853710 208-03710

Beware the big wave.

Hindley, K.

Address not stated

New Scientist, 77(1089), 346-347, (1978)

LANGUAGES: English

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7806

The generation and passage of tsunamis in the Pacific Ocean are discussed in this article. The sequence of waves, the differing spectra as the waves moves from deep to shallow water and the effects on the deep levels of the ocean are discussed. Reports and evidence of damage are used to illustrate the immense power of these waves. The usage of the network of around 100 seismic and wave monitoring stations to warn areas of possible damage is discussed.

ENVIRONMENT: Marine

IDENTIFIERS: tsunamis; I, Pacific; deep water; shallow water; monitoring stations; damage

SECTION HEADING CODES: 2167

0853683 208-03683

Long period waves at a mouth of a bay in a basin.

Nakamura, S.

Disaster Prev. Res. Inst., Kyoto Univ., Gokasho, Iji, Kyoto,

611 Japan

J. Oceanogr. Soc. Jap., 33(1), 47-53, (1977)

LANGUAGES: Japanese

SUMMARY LANGUAGES: English ; Japanese

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7806

By a model bay with a mouth and a narrow, an experiment on long period waves is carried out to discuss the behavior of the tsunamis and storm surges. Emphasis is placed on the analysis of the characteristics of the current velocities associated with the long period waves incoming through the mouth in terms of Ursell's parameter.

DESCRIPTORS: long waves; models; tsunamis; water currents

ENVIRONMENT: Marine

IDENTIFIERS: storm surges

SECTION HEADING CODES: 2163

0853667 208-03667

Modelling criteria for long water waves.

Haimack, J.L.; Segur, H.

Coast. Oceanogr. Eng. Lab., Dep. Eng. Sci., Univ. Florida,

Gainesville, Fla. USA

J. Fluid Mech., 84(2), 359-373, (1978)

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7806

Model equations which describe the evolution of long-wave initial data in water of uniform depth are tested to determine explicit criteria for their applicability. The authors consider linear and nonlinear, dispersive and non-dispersive equations. Separate criteria emerge for the leading wave and trailing oscillations of the evolving wave train. The evolution of the leading wave depends on two parameters: the volume (non-dimensional) of the initial data and an Ursell number based on the amplitude and length of the initial data. The magnitudes of these two parameters determine the appropriate model equation and its time of validity. For the trailing oscillatory waves, a local Ursell number based on the amplitude of the initial data and the local wave-length determines the appropriate model equation. Finally, these modelling criteria are applied to the problem of tsunami propagation. Asymptotic (t.a.p.) linear dispersive theory does not appear to be applicable for describing the leading wave of tsunamis. If the length of the initial wave is approximately 100 miles, the leading wave is described by a linear non-dispersive model from the source region until shoaling occurs near the coastline. For smaller lengths (about 40 miles) a linear dispersive (but not asymptotic) model is

applicable. The longer-period oscillatory waves following the leading wave, which can induce harbour resonance, apparently require a nonlinear dispersive model.

DESCRIPTORS: long waves; models; tsunamis

ENVIRONMENT: Marine

SECTION HEADING CODES: 2162

0853386 208-03386

Tsunami hazard and design of coastal structures. 15th Coastal Engineering Conference Honolulu, HI(USA) 11 Jul 1976 Panaras-Carayannis, G.

International Tsunami Information Center, PO Box 3650, Honolulu, HI 96811, USA

PUBL: American Society of Civil Engineers, New York, NY (USA), 1976, v.3 p.2248-2253

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Conference; Book

JOURNAL ANNOUNCEMENT: 7805

Damage of coastal structures by tsunamis results by the direct and indirect action of hydrostatic and dynamic pressures, foundation failures, overtopping and flooding. Reliable assessment of the potential tsunami hazard at a coastal site and adequate engineering design of critical structures require analysis and understanding of all aspects of a tsunami system leading to its terminal behavior. Description of the space-time history of tsunami waves generated by impulsive disturbance require consideration of events and processes in the following regimes: (a) generation (b) propagation and dispersion and (c) termination. Processes and events in each regime during the development of a tsunami are under their own unique hydrodynamic constraints but are dependent on what has preceded. In predicting tsunami wave characteristics at some distance from the generating source, the error structure may be pyramidal. Essential to any method of tsunami prediction at a distant or a nearby coast will be the full consideration and study of tsunami generative mechanisms. If the tsunami generation mechanics cannot be deduced with a reasonable degree of accuracy, it is not likely that the tsunami terminal aspects will be reliably predicted. Prediction of tsunami height at a distant or at a nearby coast requires knowledge of the magnitude and type of ground displacements in the tsunami generating area and of the characteristics of the surface waves resulting from such action. Although all mechanisms involved during tsunami generation are not fully understood, it is possible to obtain a suitable tsunami initiating function through the use of experimental data, historical data, and established empirical relationships, for each type of generating mechanism. Reliable computation of the tsunami propagation effects over and across the ocean can be obtained with proper modeling to provide an adequate description of the tsunami energy flow through the use of physical and numerical studies. Similarly, the terminal aspects and nearshore modification of the tsunami wave system can be approximated to provide the engineering criteria necessary for the assessment of the potential tsunami hazard at a coastal site.

ENVIRONMENT: Marine

IDENTIFIERS: hydrodynamics

SECTION HEADING CODES: 2365

0853012 208-03012

Seismic sea waves - tsunamis.

Murty, T.S.

Address not stated

Bull. Fish. Res. Board Can., (no.198)

PUBL: Department of Fisheries and the Environment, Fisheries and Marine Service, Ottawa (Canada), 1977, 337 p.

LANGUAGES: English

SUMMARY LANGUAGES: English; French

Numerical data. Includes extensive bibliography.

DOC TYPE: Numerical data; Bibliography; Book

REPORT NO.: ISBN 0-660-00565-4

JOURNAL ANNOUNCEMENT: 7805

This Bulletin is an attempt to synthesize current knowledge of tsunamis. Although it is directed primarily to oceanographers, other disciplines are not excluded. The book deals with phase and amplitude dispersion problems and the 'Unsell' parameter, which delineates various regimes of dispersion. The classical Cauchy-Poisson problem is also introduced and the subsequent developments in the field of water-wave generation due to explosions is discussed. Tsunami generation by earthquakes and seismic sources such as volcanic explosions and nuclear explosions is considered. Some related phenomena such as landslides and turbidity currents are also included. The propagation of tsunamis across the oceans is discussed. The influences of refraction, diffraction, and scattering is examined, and the problem of trapping tsunami energy by islands and shoals is examined in detail. The coastal tsunami problems such as fore-runner, initial withdrawal of water, secondary undulations, and tsunami bore are included, as well as the influence of resonance on tsunamis. Tsunamis in various parts of the world are described. Tsunami warning systems of the past, present, and future are discussed, as well as tsunami instrumentation and protection measures. Background information on seismology is in the Appendix (in microfiche form).

ENVIRONMENT: Marine

IDENTIFIERS: tsunamis; oceanology; seismic activity; seismic refraction; dispersion; wave energy; coastal zone; wave forecasting; seismology; World Oceans

SECTION HEADING CODES: 2167

0852965 208-02965

Regional network for coastal engineering data. 15th Coastal Engineering Conference Honolulu, HI (USA) 11 Jul 1976
Seymour, R.J.; * Sessions, M.H.

Scripps Inst. Oceanogr., La Jolla, CA 92037, USA
PUBL: American Society of Civil Engineers, New York, NY (USA), 1976, 1, 60-71

LANGUAGES: English
SUMMARY LANGUAGES: English
DOC TYPE: Conference; Book
JOURNAL ANNOUNCEMENT: 7805

A sufficient data bank has already been acquired to allow some tentative conclusions on the eventual usefulness of these measurements: (1) The ability to discriminate low amplitude, long-period oscillations has been dramatically illustrated by the record of a tsunami reverberation made on 4 Dec 1975, four days after the earthquake on Hawaii. The unconnected bottom pressure time history is shown. Although the original tsunami arrival had been detected by the tide gaging station at Scripps Institution of Oceanography, this reverberation was not detectable. (2) The influence of tides on spectral shape is significant when wind waves are small. A pressure record in which the mean sea level shift caused by the tide can be easily distinguished is shown. (3) It has long been reasoned that point-to-point variations in nearshore wave climate are large. The present record of the network indicates that these variations may be even larger than anticipated. The intense spatial variability within an 18-mile stretch of coastline during a single month are shown qualitatively. The vertical dimension suggested by this plot is absolute energy plotted at the same scale for all stations. This variability, both temporal and spatial, reinforces the need for closely spaced nearshore wave measuring stations reporting more than once per day in order to characterize the impact of the wave climate on the shoreline.

ENVIRONMENT: Marine
IDENTIFIERS: tides; wind waves; tsunamis
SECTION HEADING CODES: 2162

0851573 208-01573

Numerical models of huge tsunamis off the Sanriku Coast. 15th Coastal Engineering Conference Honolulu, HI (USA) 11 July 1976.

Iwasaki, T.
Tohoku Univ., Tohoku, Japan
PUBL: American Society of Civil Engineers, New York, NY (USA), 1976, 1, 1044-1059

LANGUAGES: English
SUMMARY LANGUAGES: English
DOC TYPE: Conference; Book
JOURNAL ANNOUNCEMENT: 7803

Although numerical computations of the generation and propagation of tsunamis are successfully achieved in recent years, modeling of their wave sources is still a big problem.

Three kinds of wave source model, that is statistical, oceanographic and fault model, are studied in this paper. It is found that the first model gives reasonable wave heights as shown in the previous paper, the second one presents roughly one half of those for the first model and the last one produces too small wave heights. Based on the analysis of computed results, nature of undulations off from the shore boundary, directivity of wave propagation and the spindle-shaped leading part are discussed. Comparing magnitude of various wave parameters for the leading wave along the minor axis of the wave source, it is shown that the long wave approximation modified by the slope effect illustrates the tsunami in deep region of the sea and the slope effect is most dominant in shallow region.

GEOGRAPHIC DESCRIPTORS: INW, Japan, Sanriku Coast
ENVIRONMENT: Marine
IDENTIFIERS: water waves
SECTION HEADING CODES: 2167

0851572 208-01572

Numerical simulation of tsunamis originating in the Peru-Chile trench. 15th Coastal Engineering Conference Honolulu, HI (USA) 11 July 1976.

Garcia, A.W.; Butler, H.L.
USAE Waterways Exp. Stn., Vicksburg, MS 39180, USA
PUBL: American Society of Civil Engineers, New York, NY (USA), 1976, 1, 1025-1043

LANGUAGES: English
SUMMARY LANGUAGES: English
DOC TYPE: Conference; Book
JOURNAL ANNOUNCEMENT: 7803

A previous report (Houston, et al., 1975) addressed the subject of tsunami vulnerability of the Pacific Coast of the continental USA to tsunamis originating in the Aleutian Trench. That report determined the variation in tsunami amplitude as a function of coastal distance due to a standard uplift source at different locations in the Aleutian Trench. The present report is a continuation of that study and addresses the subject of tsunami vulnerability along the same stretch of coast to tsunamis originating in the Peru-Chile Trench. In addition, modifications to the numerical code used in the previous report allowed the simulation of the Chile tsunami of 22 May, 1960.

GEOGRAPHIC DESCRIPTORS: ISE, Peru-Chile Trench
ENVIRONMENT: Marine
SECTION HEADING CODES: 2167

0851571 208-01571

Tsunami inundation prediction. 15th Coastal Engineering Conference Honolulu, HI (USA) 11 July 1976.

Bretschneider, C.L.; Wybro, P.G.
Dep. Ocean Eng., Univ. Hawaii, Honolulu, HI 96822, USA
PUBL: American Society of Civil Engineers, New York, NY
(USA), 1976, 1, 1006-1025

LANGUAGES: English
SUMMARY LANGUAGES: English
DOC TYPE: Conference; Book
JOURNAL ANNOUNCEMENT: 7803
This paper concerns the run-up and inundation characteristics of tsunami surges. The forces and moments produced by the waves are not discussed, however, the proposed technique does provide the necessary information for the wave determination. The method relies on the knowledge of the wave elevation at the coast (as determined from historical data or other means) and an estimation of the bed roughness. The considerations and calculations involved in determining these parameters are discussed in detail. Twenty-four observed run-ups on the island of Hawaii in the case of the 1946 Aleutian tsunami, and 18 run-ups on the island of Maui for the Chilean 1960 tsunami are used to illustrate the technique. Methods are also presented to predict the shoreline heights and extent of inundation of tsunami surges where historical data is not available.

GEOGRAPHIC DESCRIPTORS: ISE, Hawaii

ENVIRONMENT: Marine
SECTION HEADING CODES: 2167

0851570 208-01570

Transformation of tsunamis in a coastal zone. 15th Coastal Engineering Conference Honolulu, HI (USA) 11 July 1976.

Nakamura, S.; Higuchi, H.; Tsuchiya, Y.
Disaster Prevention Res. Inst., Kyoto Univ., Uji, Kyoto, Japan
PUBL: American Society of Civil Engineers, New York, NY
(USA), 1976, 1, 988-1005

LANGUAGES: English
SUMMARY LANGUAGES: English
DOC TYPE: Conference; Book
JOURNAL ANNOUNCEMENT: 7803

In order to obtain fundamental informations to establish warning practices and effective countermeasures against the tsunamis on the coast, the authors have studied on refraction of the tsunamis propagating into Osaka Bay and on tsunami spectra. The refraction of the tsunami is studied by a numerical computation for a program of refraction and shoaling of small amplitude wave. An example is shown for Chilean tsunami in 1960 to reveal that the refraction is an important factor to study on the tsunami wave height distribution along the coast of Kii Peninsula and Shikoku Island. The mareograms of the tsunamis are analyzed to obtain power spectra to study on transformation of the tsunamis from the Pacific Ocean to

the head of Osaka Bay. The result suggests that it is necessary to be careful to study on transformation of the tsunamis with use of the refraction diagram because the tsunami is not a simple monochromatic and small amplitude plane wave. A brief remark is given for the analysis of the tsunami as non-stationary process.

GEOGRAPHIC DESCRIPTORS: INW, Japan, Osaka Bay; I, Pacific
ENVIRONMENT: Marine
SECTION HEADING CODES: 2167; 2392

0851569 208-01569

Tsunami propagation in the Pacific Ocean. 15th Coastal Engineering Conference Honolulu, HI (USA) 11 July 1976.

Engel, M.; Zahel, W.
Inst. Meereskd., Univ. Hamburg, Hamburg, GFR
PUBL: American Society of Civil Engineers, New York, NY
(USA), 1976, 1, 971-987

LANGUAGES: English

SUMMARY LANGUAGES: English

DOC TYPE: Conference; Book

JOURNAL ANNOUNCEMENT: 7803

The Alaska tsunami of 28 March, 1964, caused by a tectonic uplift, propagated across the Pacific Ocean and was even recorded at the shores of New Zealand and the Antarctica. The large distance propagation of this tsunami is investigated by a numerical model based on the shallow water equations. The model includes bottom friction, eddy viscosity and Coriolis acceleration and yields the water elevation and the vertically integrated current velocity. The generation mechanism is given by a simplified initial condition, that is derived from the observed average uplift of 1.8 m for an area of 110 000 km.SUP-2. on the Continental Shelf. The computed tsunami propagation is presented by means of the first wave travel time and height on Pacific Ocean maps and by giving sea surface time series for selected stations. These computed results are compared with observations, especially considering the limitations of the model due to the coarse grid net having been used.

GEOGRAPHIC DESCRIPTORS: I, Pacific

ENVIRONMENT: Marine

IDENTIFIERS: models; computer programmes

SECTION HEADING CODES: 2167

0850974 208-00974

Acoustical sensing of oceanic processes. Joint Oceanographic Assembly Edinburgh (UK) 13 Sep 1976.
Brekhovskikh, L.M.

Acad. Sci. USSR

PUBL: Publ. by: FAO-Rome, (Italy), 1976, G5, 13

LANGUAGES: English

DOC TYPE: Conference; Summary; Book

JOURNAL ANNOUNCEMENT: 7802

There exist 3 main reasons why acoustic waves have become an effective instrument for exploration of the ocean (1) due to their small absorption in the water sound waves can propagate over much greater distances, than any other kind of radiation. The plane sound wave of frequency 100 Hz suffers its ten-fold decrease of intensity at distances as great as 1000 km! True, absorption is greater at higher frequencies (2) Universality of acoustical methods. There exist hardly any phenomenon in the ocean's depth that does not leave a trace in the underwater man made or natural sound field (3) High sensitivity of acoustical methods. A fish several centimetres long can be easily detected at a distance of several kilometres due to resonance scattering of sound by its swimming-bladder. Studying the reflection and scattering of sound waves one can determine the spectrum of surface waves, concentration and dimensions of air bubbles beneath the surface and fine thermohaline structure of the water. The application of echo sounders and acoustic side scanners makes it possible to reveal the major elements of the sea bottom relief, while minor irregularities of the bottom are detected by sound scattering at the water-bottom interface. Seismoprofiling and seismo-acoustic methods are essential for 'sounding' the earth crust down to the mantle. Propagation of the sound along fixed paths of different length makes it possible to study turbulence and internal waves. Acoustic waves are successfully used in the study of sea currents. Ambient noise supplies important data on underwater life in the ocean as well as the condition of water surface and the atmosphere above it at great distances. The information obtained is also essential for the forecast of a tsunami. Using high frequency ultrasound one can get the acoustical image of the underwater object. After that it is possible to transform it into optical image so that we can see through the turbid water, nontransparent for light. Results of some interesting acoustic experiments, perspectives and difficulties are discussed.

ENVIRONMENT: Marine

IDENTIFIERS: acoustic equipment; tsunamis

SECTION HEADING CODES: 2201

0850900 208-00900

Tsunamis induced by submarine slumpings off the coast of Israel

Striem, H.L.; Miloh, I.

Israel Atomic Energy Comm., Tel Aviv., Israel

Int. Hydrogr. Rev., 53(2), 41-55, (1976)

LANGUAGES: English

SUMMARY LANGUAGES: English

37 ref.

DOC TYPE: Journal Article

JOURNAL ANNOUNCEMENT: 7802

In the course of history several extreme changes in the sea level along the coast of the Levant have occurred. As these events have always been associated with earthquakes they were often described as tsunami or seismic sea waves. Reviewing the historical descriptions of such events at Israel's coast, one finds more often a recession of the sea than a flooding of the shore. Such events may have been caused by slumpings on the continental slope. Based on data of actual submarine scars, a quantitative evaluation of this hypothesis was made. It was found that the slumping of a mass 6 km long, 2 km wide and about 50 m deep would cause the formation of a shock-induced solitary wave of about 10 m in height at the edge of the continental slope. The accompanying draw-down of the sea level at the coast would last about 1/2-1.1/2. hours, and lay the sea floor bare for a distance of about 1/2-1.1/2. km, in agreement with some historical descriptions. Though possibly occurring only once or twice in a millennium, earthquake-induced slumpings may constitute a danger to nuclear power plants, and not just to maritime vessels and installations.

DESCRIPTORS: tsunamis

GEOGRAPHIC DESCRIPTORS: MED, Israel

ENVIRONMENT: Marine

IDENTIFIERS: sea level; tidal waves; continental slopes;

numerical analysis; mathematical models

SECTION HEADING CODES: 2167

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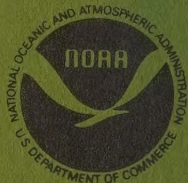
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